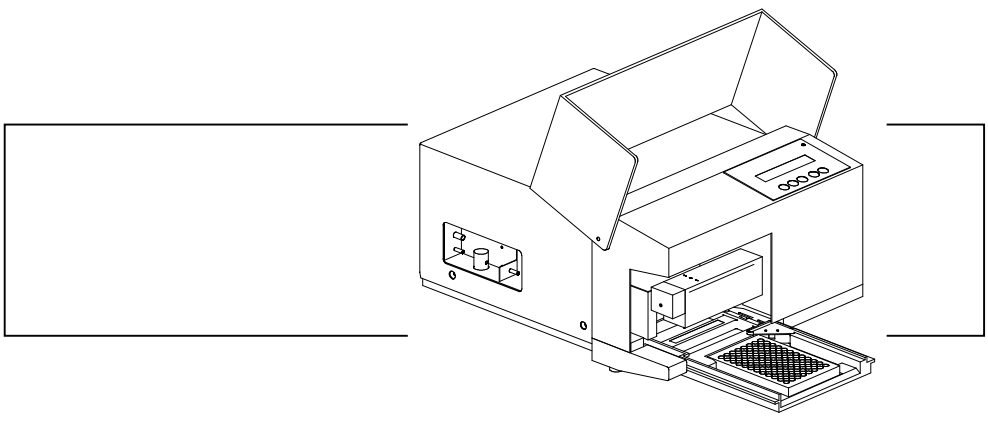
Microplate Washer LP40/LP41

User manual

User Manual code : 40B030e

Revision September 2005



English

3 rue Denis Papin – 67300 Schiltigheim – France – tel. (33) 3 88 19 70 50 – fax (33) 3 88 62 52 98

TABLE OF CONTENTS

ABOUT THIS MANUAL **4**

IMPORTANT NOTICE **4**

SAFETY INFORMATION **5**

SAFETY SYMBOLS **6**

1•FEATURES AND SPECIFICATIONS **7**

1.1 LP40 BASIC FEATURES 7
1.2 LP40 OUTSIDE DIMENSIONS [mm] 8
1.3 LP40 HYDRAULIC CIRCUIT 9
1.4 LP41 BASIC FEATURES 10
1.5 LP41 OUTSIDE DIMENSIONS [mm] 11
1.6 LP41 HYDRAULIC CIRCUIT 12
1.7 TECHNICAL FEATURES 13
1.7.1 ELECTRICAL DATA 13
1.7.2 PHYSICAL DATA 13
1.7.3 HARDWARE SPECIFICATIONS 13
1.7.4 SOFTWARE SPECIFICATIONS 14
1.8 SOFTWARE PARAMETERS FOR WASH PROTOCOLS 15
1.8.1 WASH PROTOCOL DEFINITION 15
1.8.2 METHODS 16
1.8.3 PARAMETER'S DEFINITIONS 18

2• INSTALLATION **27**

2.1 UNPACKING 27

3• OPERATING INSTRUCTIONS **29**

3.1 RUN MODE 29
3.1.1 HOW TO USE THE KEYBOARD 29
3.2 MICROPLATE LOADING 30
3.3 SELECT ONE KIT 31
3.4 WASH INTERRUPTION OR POWER FAILURE 33
3.4.1 WASH INTERRUPTION 33
3.4.2 POWER FAILURE 33
3.5 RINSE 34
3.5.1 RINSE (WITH LP40) 34
3.5.3 RINSE (WITH LP41) 35
3.5.4 AUTOMATIC RINSING (WHIT LP41) 35
3.6 CONFIGURATION 36
3.6.1 MAIN MENU 36
3.6.2 WASHER'S CONFIGURATION 37
3.7 PROGRAMMING 40
3.7.1 KIT STRUCTURE 40
3.7.2 ACCESS TO PROGRAMMING MODE 41
3.7.3 PROGRAMMING SYNOPSIS 42
3.7.4 ADD 43
3.7.4.1 ADD: KIT 43
3.7.4.2 ERRORS in KIT programming 44
3.7.4.3 ADD: METHOD 45
3.7.4.4 ERRORS on METHOD programming 46
3.7.4.5 ADD: PLATE 47
3.7.4.6 ERRORS on PLATE programming 50
3.7.5 INSERT 51
3.7.5.1 INSERT:KIT 51
3.7.5.2 TEMPORARY KIT 51
3.7.5.3 INSERT : METHOD 51
3.7.5.4 INSERT: PLATE 52
3.7.6 DELETE 53
3.7.6.1 DELETE:KIT 53
3.7.6.2 DELETE: METHOD 53
3.7.6.3 DELETE: PLATE 54
3.7.6.4 ERROR in PLATE deletion 54
3.7.7 EDIT 55
3.7.7.1 EDIT: KIT 55
3.7.7.2 EDIT: PLATE 57
3.7.8 COPY 58
3.7.8.1 COPY: KIT 58
3.7.8.2 ERRORS in KIT copy 58
3.7.8.3 COPY : PLATE 59
3.7.8.4 ERRORS in PLATE copy 59
3.7.9 PLATE TEST 60
3.7.10 RAM INITIALIZATION 61

4• MAINTENANCE & TROUBLESHOOTING **62**

4.1 ROUTINE MAINTENANCE PROCEDURES 62
4.1.1 DAILY MAINTENANCE 62
4.1.2 WASHER STORAGE CONDITIONS 62
4.2 CLEANING AND DISINFECTION 63
4.2.1 CLEANING THE MANIFOLD 63
4.2.2 DISINFECTION 64
4.3 TROUBLESHOOTING 65
4.3.1 HARDWARE AND SOFTWARE VERSION 65

RECOMMENDATIONS FOR OPTIMIZED WASHING CONDITIONS ON LP40 / LP41 WASHERS 66

APPENDIX **67**

REVISION UPGRADE DESCRIPTION 67

INDEX **68**

IMPORTANT

Please read carefully before using the PLATE WASHERS LP40 or LP41

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NOTA :

The LP40/41 microplate washers can be integrated into a system together with other instruments, in order to make biologic medical assays.

About this manual

This manual has been written for the laboratory technician and describes how to use the LP40 and LP41 plate washers.
This manual is designed to give you the necessary information you need to :

- install the LP40 or the LP41
- operate with the LP40 or the LP41 to suit your particular needs
- perform the LP40 or the LP41 basic maintenance procedures, including disinfection.

This manual also describes all the features and specifications of the LP40 and LP41 hardware and configuration software.

Important Notice

Before installing this unit, please read carefully the installation instructions.
This instrument can only be used to wash 96-well microplates with 8, 12 or 2*8 channel manifolds or 384 well micro-plates with 1*16 channel manifold.
This washer is intended for clinical diagnostic and research laboratory use and must be operated only by specialized personnel aware of the potential risks connected to the chemical and bacteriological agents normally used with this unit.
The Aerosol Protection Cover must always be closed when the instrument is operated to reduce the risk of contamination from ambient air. Since the unit is not completely sealed, this risk is not completely eliminated, and the operator should dress with appropriate safety protection when using hazardous substances or biological agents.
While the unit is connected to the power, it is dangerous to operate without the protective cover. Operation without the cover may be performed only by specialized and trained service personnel.
Read carefully the recommendations for optimized washing conditions provided in the appendix of this manual.
Contact your local representative if service is required.

SAFETY INFORMATION

WARNING:

ELECTRIC'S SHOCK HAZARD

To operate, the instrument must be mandatory connected to a wall socket equipped with earth.

The access to the mains supply input plug, located on the instrument's rear panel, must be kept free in order to use this plug, if necessary, as cut-off device.

Although this instrument is fully insulated and grounded, it is important for all users to be aware of the potential hazards of using liquids in close proximity to an electrical supply. In the event of any spillage, the instrument must be immediately isolated from the electrical supply and drained. Spilt liquid should be removed as soon as possible.

Serious damage to the instrument may occur if fluid is allowed to penetrate the case. The electrical supply MUST NOT be reconnected until the instrument has been fully inspected by a qualified technician or service engineer.

SERVICING MUST ONLY BE CARRIED OUT BY A QUALIFIED TECHNICIAN OR SERVICE ENGINEER.

WARNING:

SPILLAGES

In some operating modes (e.g. dispensing fluids or purging the system, particularly under automatic control) it is possible to overfill the wells of a microplate. This can result in spillage of liquids and/or contamination with hazardous substances. Care should be taken to ensure that overfilling does not occur.

If environmentally hazardous fluid is spilled, the instrument must first be isolated from the electrical supply and physically isolated from the working environment by placing it in a fume cupboard or similar location. Contact the nearest service centre for assistance, advising them of the health hazards associated with the spilled materials.

WARNING:

INCORRECT OPERATION

OPERATING THIS EQUIPMENT IN WAYS OTHER THAN DETAILED IN THIS MANUAL MAY IMPAIR THE PROTECTION PROVIDED BY THE INSTRUMENT.

DO NOT operate this equipment with the covers removed – potentially dangerous voltages are contained within.

DO NOT operate this equipment with the safety earth (ground) disconnected.

CAUTION DO NOT poke fingers, pencils or other implements into plate carrier entry slot.

BE PREPARED for unexpected movement of the plate carrier and noise from the Washer pump when the Washer is controlled by external computer.

ENSURE that the main power cable is correctly wired. Colour codes are as follows :

Europe		**United States**	
BROWN	**LIVE**	**BLACK**	**LIVE**
BLUE	**NEUTRAL**	**WHITE**	**NEUTRAL**
GREEN/YELLOW	**EARTH (Ground)**	**GREEN**	**GROUND**

ENSURE that all connections are tight and all blocking elements (foams, …) have been removed before switching on the Washer.
If there is any doubt or concern about the safety of the instrument contact the nearest approved service center.

SAFETY SYMBOLS

The following alarm and information symbols can be found in several places in the washer. Only a qualified personal aware of the security procedures is allowed to repair this instrument.
Please read this manual carefully before using this instrument.

Direct current

Alternating current

Direct and alternating current

Earth (ground) terminal

Protective earth (ground) terminal

On

Off

Caution (see enclosed documents)

1• FEATURES AND SPECIFICATIONS

1.1 LP40 Basic features

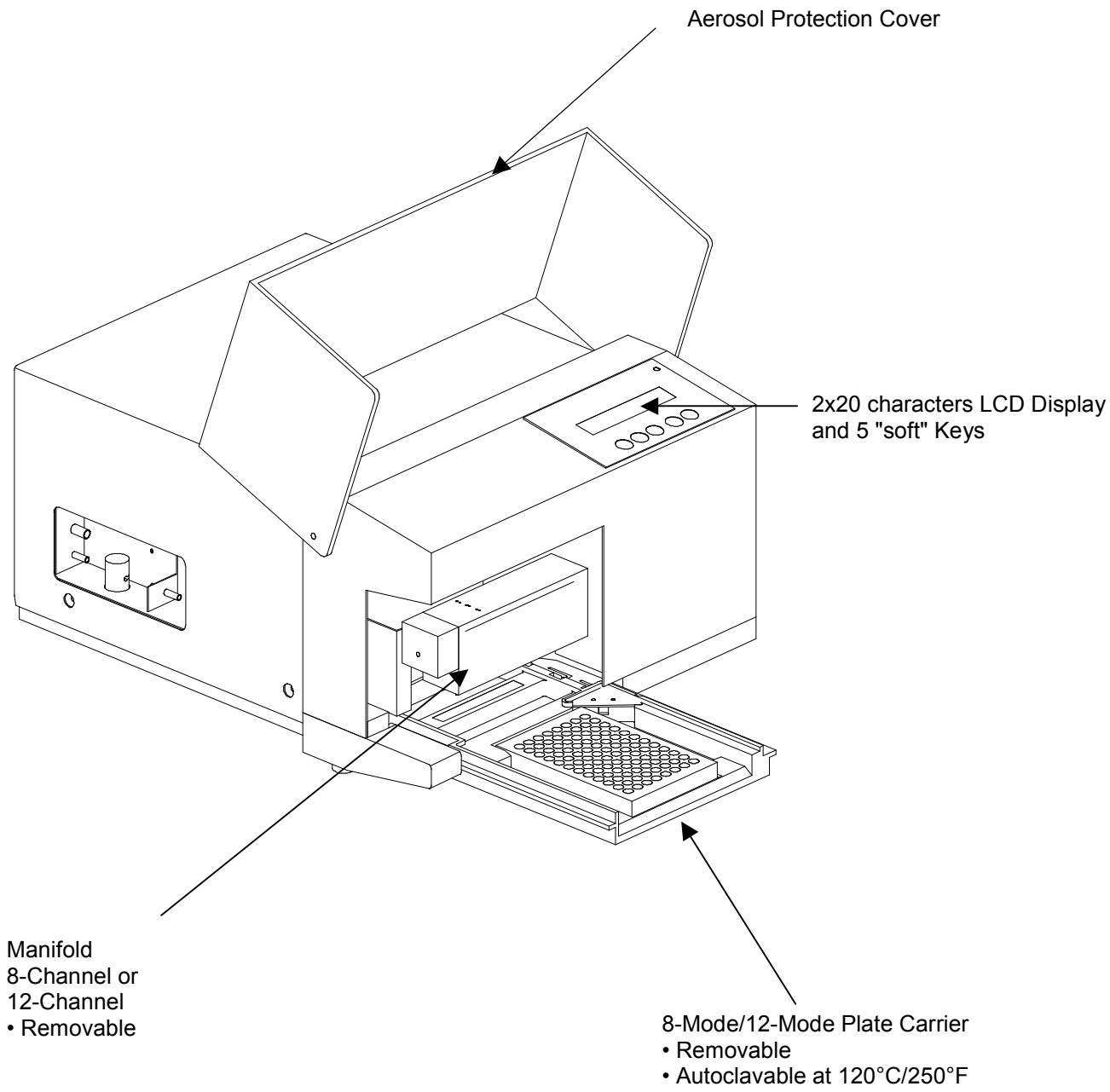


Fig. 1

1.2 LP40 Outside dimensions [mm]

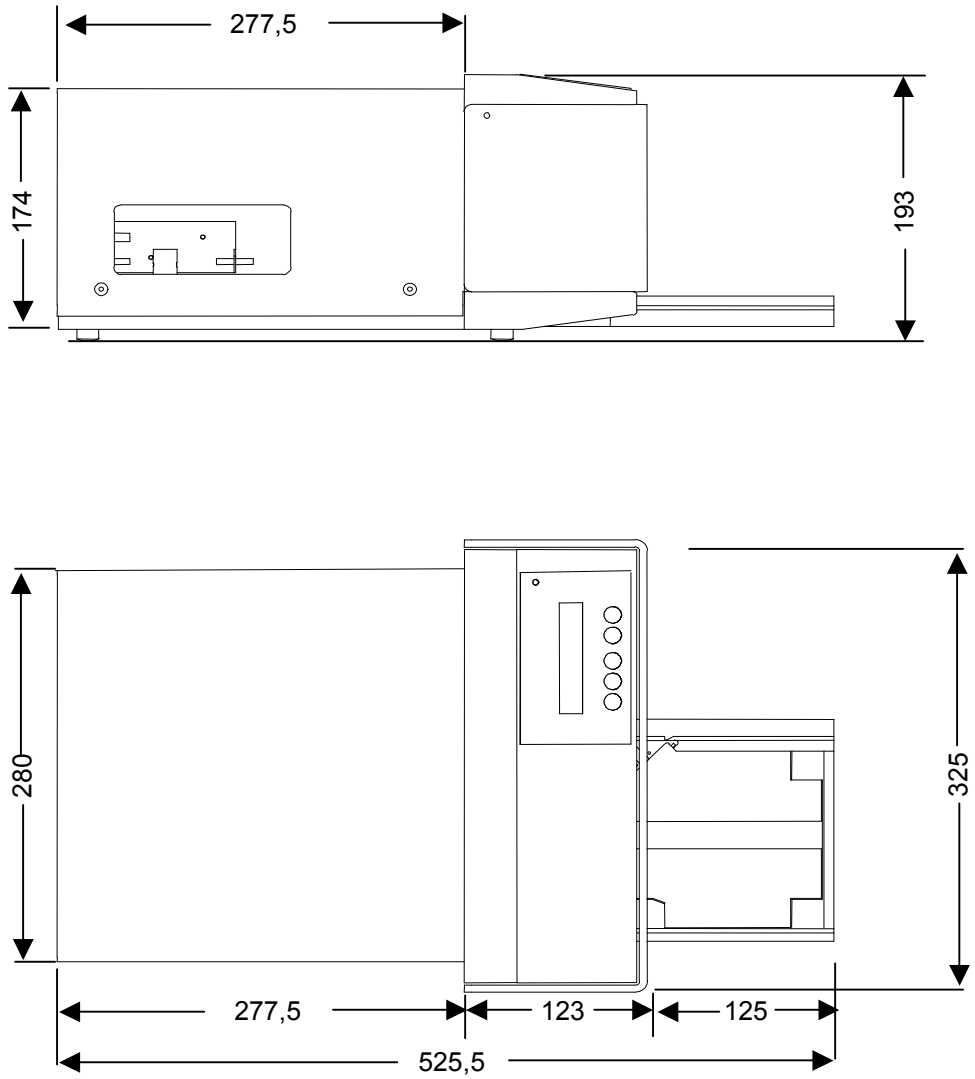


Fig. 2

1.3 LP40 Hydraulic circuit

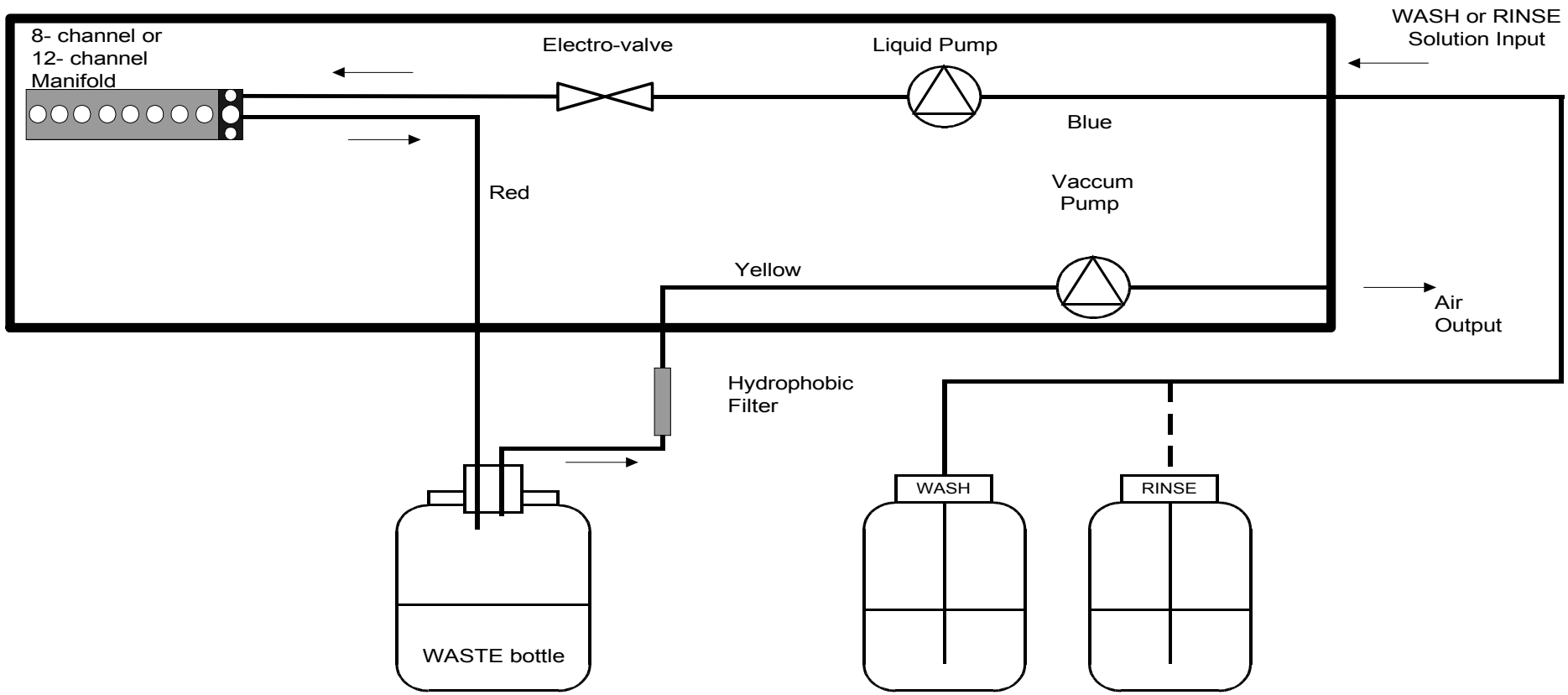


Fig : 3

1.4 LP41 Basic features

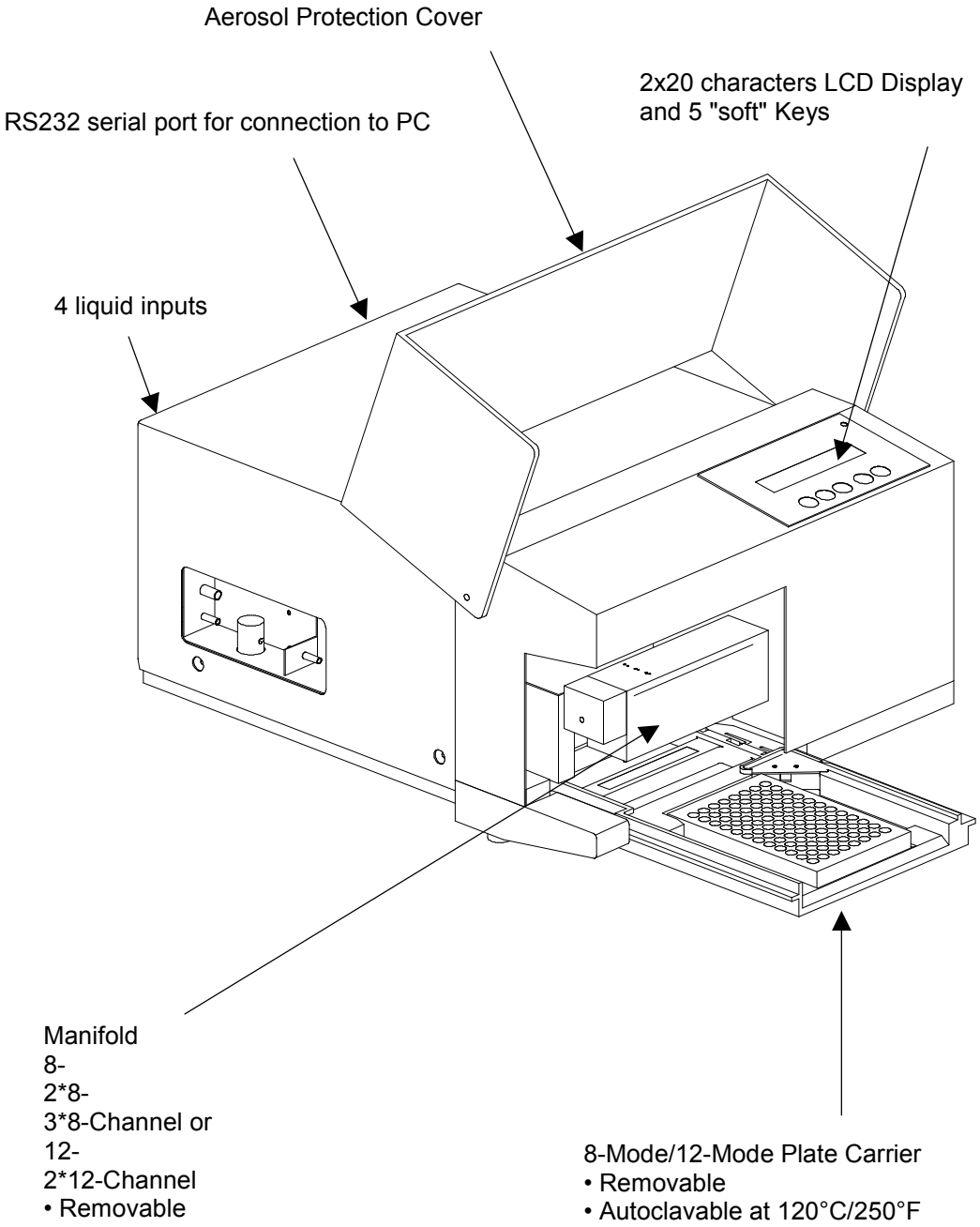


Fig. 4

1.5 LP41 Outside dimensions [mm]

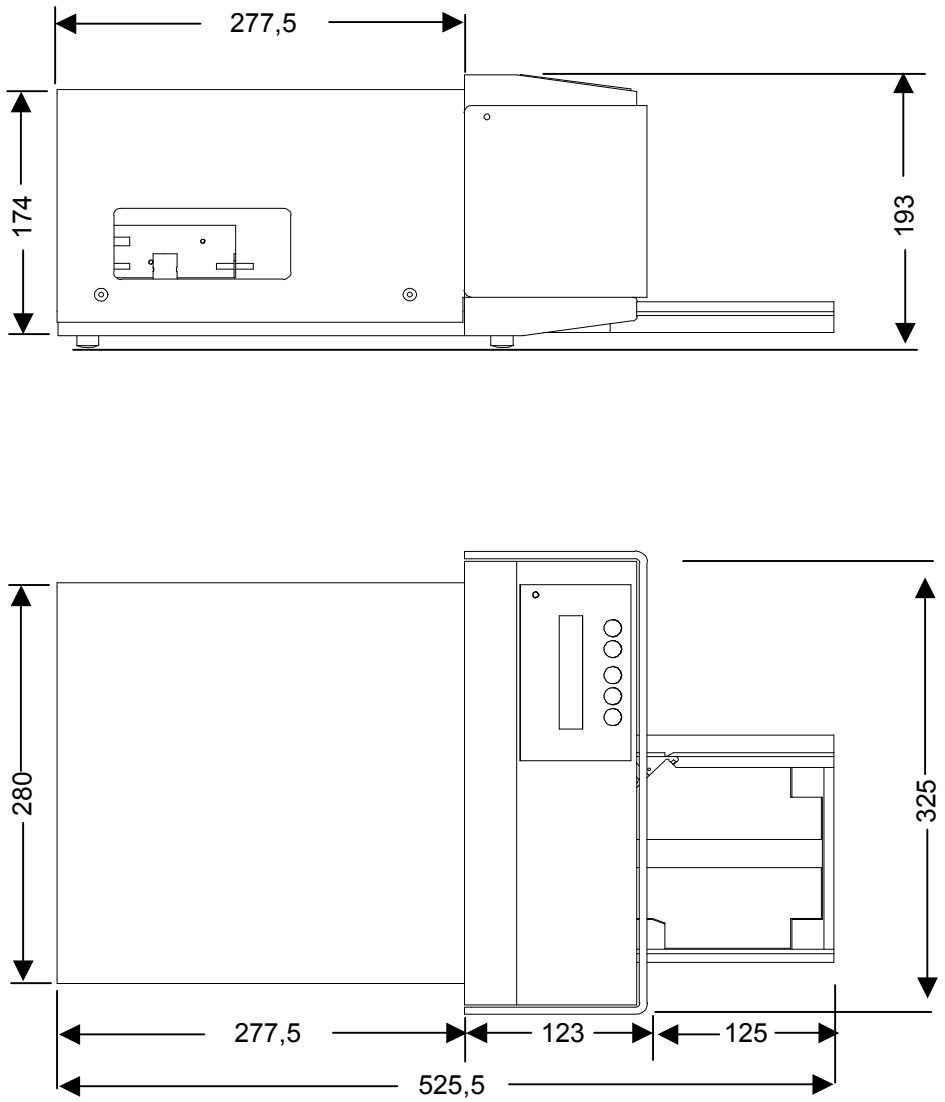


Fig. 5

1.6 LP41 Hydraulic circuit

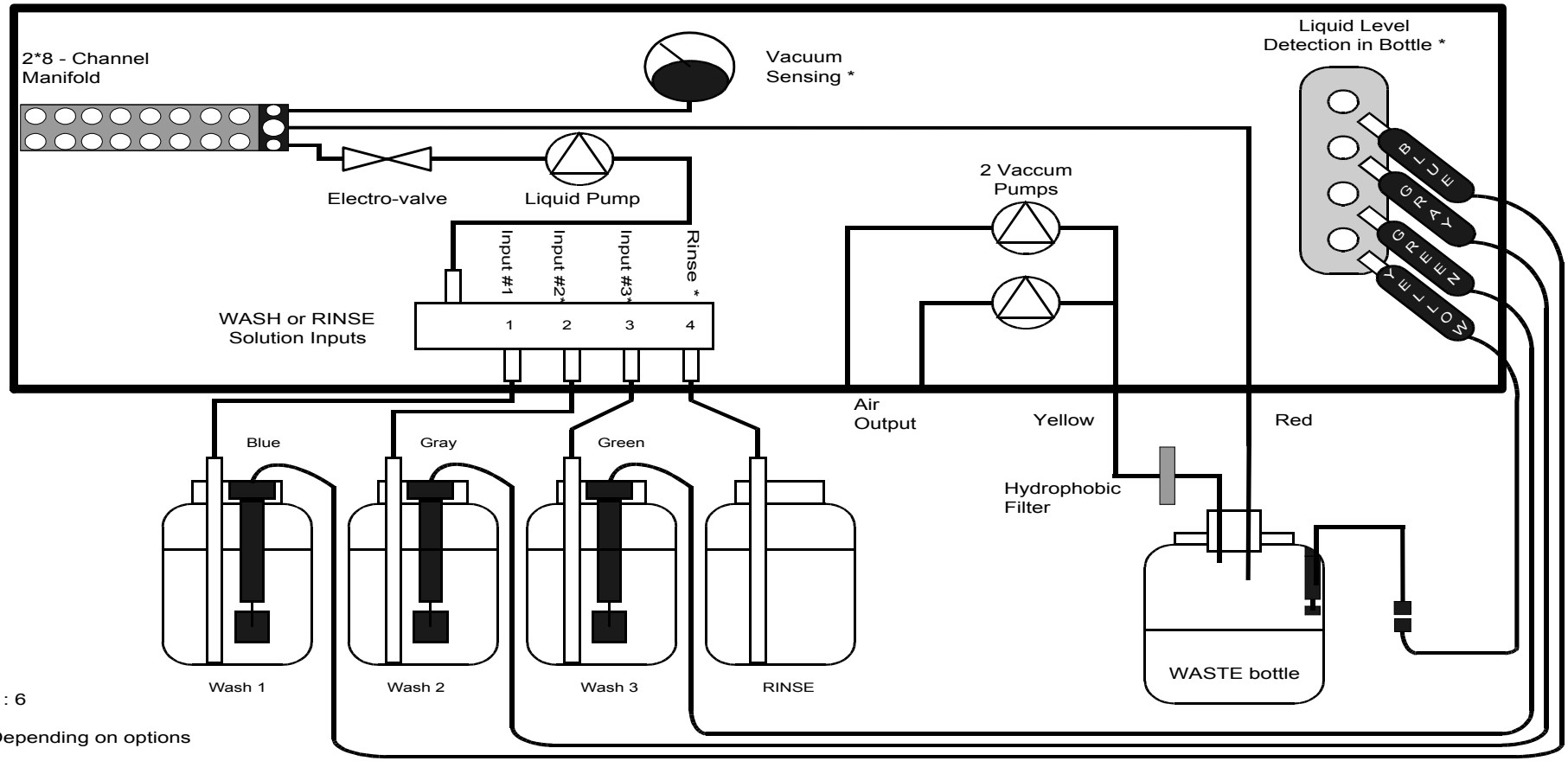


Fig : 6

* : Depending on options

1.7 Technical features

1.7.1 Electrical Data

Voltage	240 / 100 VAC, 50 / 60 Hz
Consumption	100 VA max
Fuses	2,5 AT (2 fuses, 5x20 mm)
Power Cord	on CEI socket

1.7.2 Physical data

Dimensions, including bottles

Width	368 mm,LP40 683mm, LP41
Length	530 mm, Plate carrier out, LP40 & LP41.
Height	483 mm, LP40 443 mm, LP41.
Weight (without accessories)	11,0 Kg, LP40 11,6 Kg, LP41
Operating conditions	15 - 30 °C / 15 - 85 %R.H.

1.7.3 Hardware specifications

Manifold	LP40:	8 or 12 channel
	LP41:	8, 2*8, 3*8, 12 or 2*12 channel
Vacuum power	LP40 :	1 integrated vacuum pump (maxi 8 L/min)
	LP41 :	2 integrated vacuum pumps (maxi 16 L/min).
Volume of WASTE bottle		
	LP40 :	2 litres
	LP41:	8 litres
User interface :		Flat keyboard with 5 diaphragm keys 2x20 characters LCD screen , backlighted on LP41.

1.7 Technical features (continued)

1.7.4 Software specifications

Kits	Up to 75 washing kits programmable. Each kit is saved under its own name (up to 15 characters) and is a combination of methods repeated or not, with or without soaking times, in strip mode or in plate mode.
Method	6 single-cycle washing methods : Wash, Aspiration, Dispensing, Bottom Washing, Bottom Aspiration, Agitation. 4 two-cycle washing methods : Wash + Aspiration, Wash + Bottom Aspiration, Bottom Wash + Aspiration, Bottom Wash + Bottom Aspiration.
Soak time	0 to 9,9 sec Strip mode 0 to 59 min 59 sec in Plate mode.
Repetition	Every method can be repeated from 1 up to 9 times.
Wash mode	Strip mode or Plate mode.
Omit strip	Strips can be omitted at kit programmation.
Plates	Up to 10 plate parameter sets programmable. Accepts flat or curved bottom microplates. Vertical and horizontal speeds, vertical and horizontal positions of the aspirating needle in relation with the wells are programmable.
Other features	-Priming sequence of the hydraulic system at change of Wash solution. -Disinfection program of the hydraulic circuit. -User programming can be inhibited.

1.8 Software parameters for Wash protocols

This section describes the Wash protocols, their methods and their software parameters.
It is useful to be read prior starting to programme new wash protocols or new kits.

1.8.1 WASH protocol definition:

A WASH protocol, also called a KIT, is made of a succession of wash Methods.
There are 10 different wash methods available and every method is programmed with its own batch of specific parameters.
Also, the Wash protocol is associated to a batch of plate parameters -Positions- that are set in respect to plate geometry (flat, U or V shaped well, …) as well as Speeds needed for the wash process.

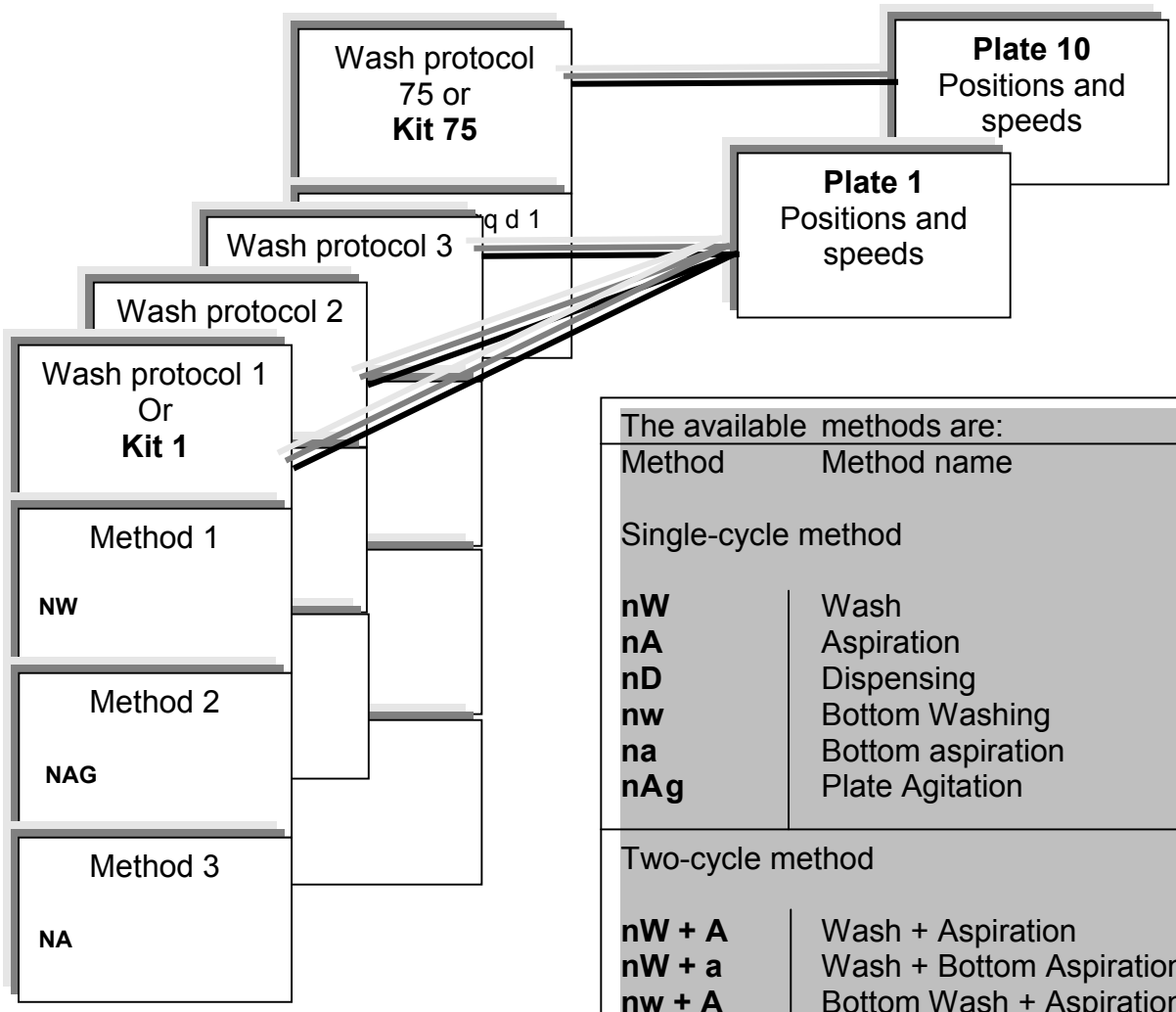

Wash protocol 75 or **Kit 75**
Wash protocol 3
Wash protocol 2
Wash protocol 1 Or **Kit 1**
Method 1 **NW**
Method 2 **NAG**
Method 3 **NA**
Plate 10 Positions and speeds
Plate 1 Positions and speeds

Fig. 7

The available methods are:	
Method	Method name
Single-cycle method	
nW	Wash
nA	Aspiration
nD	Dispensing
nw	Bottom Washing
na	Bottom aspiration
nAg	Plate Agitation
Two-cycle method	
nW + A	Wash + Aspiration
nW + a	Wash + Bottom Aspiration
nw + A	Bottom Wash + Aspiration
nw + a	Bottom Washing + Bottom Aspiration

1.8 Software parameters for Wash protocols (continued)

1.8.2 Methods

A method is a completely defined module made of one or two elementary cycles. Every kit is made of a succession of methods.

In a method, elementary cycles can be repeated n times (n =1 to 9).

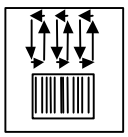
For a method using two elementary cycles, only the first cycle is applied “n” times.
When repeated several times, the waiting time between elementary cycles is called soaking time.
The waiting time between two methods is called Method Interval.
Whatever the selected mode, STRIP or PLATE (see definition below), a method is always completely finished on the whole plate prior to starting the next method.

Available methods:

Method	Abbreviated name on LCD display	Method name
Single-cycle method		
nW	**WASH**	Wash
nA	**ASPIRATION**	Aspiration
nD	**DISPENSING**	Dispensing
nw	**BOTTOM WASH.**	Bottom Washing
na	**BOTTOM ASP.**	Bottom aspiration
nAg	**AGITATION**	Plate Agitation
Two-cycle method		
nW + A	**WASH + ASP**	Wash + Aspiration
nW + a	**WASH+BOT.ASP**	Wash + Bottom Aspiration
nw + A	**BOT.WASH+ASP**	Bottom Wash + Aspiration
nw + a	**B.WASH+B.ASP**	Bottom Washing + Bottom Aspiration

Kit parameters associated to method:

• **MODE**
STRIP or PLATE

	 STRIP mode: the total method is applied on the strip prior processing the next strip.	PLATE mode: the elementary cycle is executed successively on all strips prior applying the next elementary cycle.
Example:	STRIP mode	PLATE mode
Method 3W +A	3W + A on 1st strip 3W + A on 2nd strip etc… 3W + A on last strip	W on the whole plate W on the whole plate W on the whole plate A on the whole plate

1.8 Software parameters for Wash protocols (continued)

1.8.2 Methods (contunued)

No. OF CYCLES Number of Cycles = n
1 to 9, step 1
number of elementary cycles that will be applied within the method.

• **SOAKING** Soak time
0min 0s to 59min 0s, step 1s in PLATE mode.
0min 0s to 9.9s, step 0.1 s in STRIP mode.
Waiting time between two consecutive elementary cycle within one method.

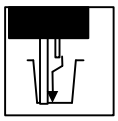
• **MET. INTER** Method Interval
0min 0s to 59min 0s, step 1 sec
Waiting time between two consecutive methods.

1.8 Software parameters for Wash protocols (continued)

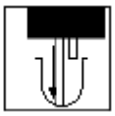
1.8.3 Parameter's definitions

Parameters directly depending on the KIT or Wash protocol (such as dispensing, aspirating times, liquids, etc…) are called "KIT Parameters",
Parameters depending on the microplate dimensions (mainly POSITION and SPEED parameters) are called "PLATE parameters".
In the washer, the elementary cycles are as follows :

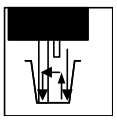
A
ASPIRATION



The aspirating needle goes down and aspirates until reaching the well bottom. The needle is shifted close to wall (*Aspiration Horizontal Position*) for flat bottom well;
it remains centered for a curved bottom well.



Programmed parameters:
Kit parameters:
• **CROSW. ASP.** Crosswise aspiration "CWA" (for flat bottom only)



YES or NO
the aspiration needle is shifted close to the wall (*Aspiration Horizontal Position*) while going down to well bottom and aspirates; once the aspiration time has elapsed, the aspiration needle is going up to approx middle of well height and is shifted opposite end of wall (no scratch on the bottom); the needle goes down to bottom and a second aspiration sequence takes place.

• **ASP. TIME** Aspiration Time
0.1 to 9.9 s, step 0.1 s
Time during which the aspirating needle is kept at the well bottom and aspirates.

Plate parameters:
• **ASP. HOR. POS.** Aspiration Horizontal Position (for flat bottom only)

0.0 (centered) to 2.0 mm, step 0.1 mm
(see also fig. 8 at the end of § 1.8)

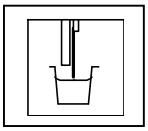
• **ASP.VERT.POS.** Aspiration Vertical Position
0.1 to 15.0 mm, step 0.1 mm (see also fig. 8 at the end of § 1.8)
0.1 is the highest needle position
15.0 is the lowest needle position

• **ASP. DOWNW. SPEED** Aspiration Downward Speed
0 to 9, step 1. (speed min. = 0; speed max. = 9)

1.8 Software parameters for Wash protocols (continued)

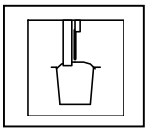
1.8.3 Parameter's definitions (continued)

D.DISPENSING



The dispensing needle is placed over the well and dispenses a wash solution in the well.
When the dispensed volume is higher than well capacity, the aspiration needle aspirates the overflow to prevent liquid spilling on next wells.

Programmed parameters:
Kit parameters:
• **VOLUME** (for one well)
50 to 3000 µl, step 50 µl
(the well volume is approx. 370 µl)



• **OVERFLOW**
1.0 to 12.9 mm, step 0.1 mm (see also fig.8 at the end of § 1.8).
This parameter sets the height of the aspirating needle and thus the height of the liquid in the well.
1.0 is the highest needle position
12.9 is the lowest needle position (for the overflow).

It is recommended to dispense a volume slightly higher than wished and have an overflow phase in order to obtain an equal dispensing of volume in each well. The slight flow rate variations among dispensing needles are compensated by the overflow phase.

• **LIQUID**
Wash W1 to Wash W9
When launching a kit in the RUN mode, the display will remind you to connect correct Wash bottle prior starting.

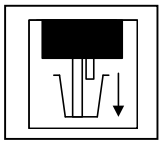
• **FLOW** Flow rate compensation
-5 to +5, step 1.
The flow rate of the dispensing pump is adapted to the operating manifold. However, the flow rate can be slightly modified with this parameter (lower flow rate whith negative value, higher flow rate with positive value).

Plate parameters:
• **DISP. UPW. SPEED** Dispensing Upward Speed
0 to 9, step 1. (speed min. = 0; speed max. = 9)

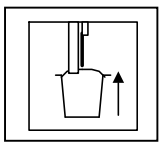
1.8 Software parameters for Wash protocols (continued)

1.8.3 Parameter's definitions (continued)

W
WASH Aspiration sequence followed by a Dispensing sequence.



Programmed parameters:
Kit parameters:
• **CROSW. ASP.** Crosswise aspiration"for flat bottom only"
YES or NO (See details on page 18)



• **ASP. TIME** Aspiration time
0.1 to 9.9 s, step 0.1 s (See details on page 18)

• **VOLUME** "for one well"
50 to 3000 µl, step 50 µl
(the well volume is approx. 370 µl)

• **OVERFLOW**
1.0 to 12.9 mm, step 0.1 mm
1.0 is the highest needle position
12.9 is the lowest needle position "for the overflow"
(See details on page 19)

• **LIQUID**
Wash W1 to Wash W9 (See details on page 19)

• **FLOW** flow rate compensation
-5 to +5, step 1. (See details on page 19)

Plate parameters
• **ASP. HOR. POS.** Aspiration Horizontal Position "for flat bottom only"
0.0 to 2.0 mm, step 0.1 mm (see also Fig. 8, at the end of §1.8)

• **ASP.VERT.POS.** Aspiration Vertical Position
0.1 to 15.0 mm, step 0.1 mm
(see also fig.8, at the end of § 1.8)
0.1 is the highest needle position
15.0 is the lowest needle position

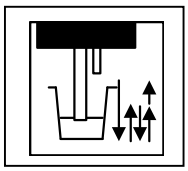
• **ASP. DOWNW. SPEED** Aspiration Downward Speed
0 to 9, step 1. (speed min. = 0; speed max. = 9)

• **DISP. UPW. SPEED** Dispensing Upward Speed
0 to 9, step 1. (speed min. = 0; speed max. = 9)

1.8 Software parameters for Wash protocols (continued)

1.8.3 Parameter's definitions (continued)

w
BOTTOM
WASH . Bottom Washing



The bottom of the well is thoroughly washed, followed by a normal Wash (W) sequence.
Following sequences are applied :
- Downward aspirating movement of the needle into the well down to *Aspiration Vertical Position.*
Aspiration at *Aspiration Vertical Position* during *Aspiration Time*.
- One or two upward dispensing movements up to *Bottom Wash Vertical Position*, dispensing at this position during a *Bottom Wash Time*
…
- Followed by a downward aspirating movement down to *Aspiration Vertical Position.*
- Aspiration at *Aspiration Vertical Position* during *Aspiration Time*.
- Dispensing up to *Overflow Position.*

In case of a crosswise aspiration (for flat bottom only):
each aspiration sequence (close to the wall) is immediately followed by another aspiration sequence to the opposite end of the wall as described on page 18.

Programmed parameters:
Kit parameters:
• **CROSW. ASP.** Crosswise aspiration “for flat bottom only “
YES or NO (See details on page 18)

• **ASP. TIME** Aspiration time
0.1 to 9.9 s, step 0.1 s (See details on page 18)

• **VOLUME** “for one well”
50 to 3000 µl, step 50 µl
(the well volume is approx. 370 µL)
Volume is applied at the last Dispensing sequence.

• **OVERFLOW**
1.0 to 12.9 mm, step 0.1 mm
1.0 is the highest needle position
12.9 is the lowest needle position (for the overflow).
Overflow is applied at the last Dispensing sequence.
(See details on page 19)

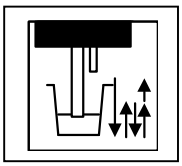
• **LIQUID** Wash W1 to Wash W9
(See details on page 19)

• **FLOW** flow rate compensation
-5 to +5, step 1. (See details on page 19)

1.8 Software parameters for Wash protocols (continued)

1.8.3 Parameter's definitions (continued)

W **Bottom Washing** (continued)



• **BOT. WASH NUMBER** Bottom Wash Number
1 or 2
Number of Bottom Wash Occurence.

• **BOTTOM TIME** Bottom Wash Time
0.1 to 9.9 s, step 0.1 s
Time when dispensing at the Bottom Wash Vertical Position.

Plate parameters:

• **ASP. HOR. POS.** Aspiration Horizontal Position "for flat bottom only"
0 to 2.0 mm, step 0.1 mm (see also fig. 8 at the end of § 1.8)
Aspiration Horizontal Position is applied for all Aspiration, Bottom Wash and Bottom Aspiration sequences.

• **ASP.VERT.POS.** Aspiration Vertical Position
0.1 to 15.0 mm, step 0.1 mm (see also fig. 8 at the end of § 1.8)
0.1 is the highest needle position
15.0 is the lowest needle position
Aspiration Vertical Position is applied for all Aspiration sequences.

• **B.W.VERT.POS.** Bottom Wash Vertical Position
0.1 to 15.0mm, step 0.1mm (see also fig. 8 at the end of § 1.8)
0.1 is the highest needle position
15.0 is the lowest needle position
Bottom Wash Vertical Position is the height of the aspirating needle during the dispensing sequence of the bottom wash.

• **ASP. DOWNW. SPEED** Aspiration Downward Speed
0 to 9, step 1. (speed min. = 0; speed max. = 9)
This speed is applied only at the first Aspiration sequence.

• **DISP. UPW. SPEED** Dispensing Upward Speed
0 to 9, step 1. (speed min. = 0; speed max. = 9)
Dispensing Upward Speed is applied at the last Dispensing sequence.

• **BOT. DOWNW. SPEED** Bottom Downward Speed
0 to 9, step 1. (speed min. = 0; speed max. = 9)
Speed of all downward movements for all bottom sequences (wash and aspiration).

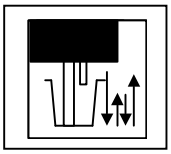
• **BOT. UPWARD SPEED** Bottom Upward Speed
0 to 9, step 1. (speed min. = 0; speed max. = 9)
Speed of all upward movements for all bottom sequences (wash and aspiration).

1.8 Software parameters for Wash protocols (continued)

1.8.3 Parameter's definitions (continued)

a Bottom aspiration

BOTTOM ASP.



The following sequence are applied:
- Downward aspirating movement of the needle into the well down to *Aspiration Vertical Position.*
- Aspiration at *Aspiration Vertical Position* during *Aspiration Time*.
- One or two upward aspirating movements up to *Bottom (Aspiration) Position* followed by a downward aspirating movement down to *Aspiration Vertical Position.*
- Aspiration at *Aspiration Vertical Position* during *Aspiration Time*.

In the case of crosswise aspiration (for flat bottom only):
every aspiration sequence (close to the wall) is immediately followed by another aspiration sequence to the opposite end of the wall as described on page 18.

Programmed parameters:
Kit parameters:
• **CROSW. ASP.** Crosswise aspiration“for flat bottom only"
YES or NO (See details on page 18)

• **ASP. TIME** Aspiration time
0.1 to 9.9 s, step 0.1 s (See details on page 18)

• **BOT. ASP. NUMBER** Bottom Aspiration Number
1 or 2 Number of Bottom Aspiration Occurence

Plate parameters:
• **ASP. HOR. POS.** Aspiration Horizontal Position “For flat bottom only”
0.0 to 2.0 mm, step 0.1 mm (see also fig. 8 at the end of § 1.8)
Aspiration Horizontal Position is applied for all Aspiration, Bottom Wash and Bottom Aspiration sequences.

• **ASP.VERT.POS.** Aspiration Vertical Position
0.1 to 15.0 mm, step 0.1 mm (see also fig. 8 at the end of § 1.8)
0.1 is the highest needle position
15.0 is the lowest needle position
Aspiration Vertical Position is applied for all Aspiration sequences.

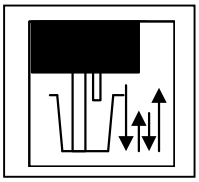
1.8 Software parameters for Wash protocols (continued)

1.8.3 Parameter's definitions (continued)

a Bottom aspiration (continued)

BOTTOM ASP. (continued)

Plate parameters (continued) :



• **BOT.VERT.POS.** Bottom (Aspiration) Vertical Position
0.1 to 15.0 mm, step 0.1 mm (see also fig. 8 at the end of § 1.8)
0.1 is the highest needle position
15.0 is the lowest needle position.
Bottom (Aspiration) Vertical Position is the height of the aspirating needle during the aspiration sequence of the bottom aspiration.

• **ASP. DOWNW. SPEED.** Aspiration Downward Speed
0 to 9, step 1. (speed min. = 0; speed max. = 9)
Aspiration Downward Speed is applied at the first Aspiration sequence.

• **BOT. DOWNW. SPEED.** Bottom Downward Speed
0 to 9, step 1. (speed min. = 0; speed max. = 9)
Speed of all downward movements for all bottom sequences (wash and aspiration).

• **BOT. UPWARD SPEED.** Bottom Upward Speed
0 to 9, step 1. (speed min. = 0; speed max; = 9)
Speed of all upward movements for all bottom sequences (wash and aspiration).

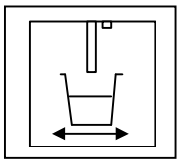
1.8 Software parameters for Wash protocols (continued)

1.8.3 Parameter's definitions (continued)

Ag Plate Agitation

AGITATION

The microplate is shaken horizontally during the *Agitation Time* with an *Agitation Amplitude* and an *Agitation Speed*.



Programmed parameters:
Kit parameters:
• **SHAKE TIME** Agitation Time
0.1 to 59.9 s, step 0.1 s

Plate parameters :
• **SHAKING AMPLITUDE** Agitation Amplitude
0 to 9, step 1

• **SHAKING SPEED** Agitation Speed
0 to 9, step 1

1.8 Software parameters for Wash protocols (continued)

1.8.3 Parameter's definitions (continued)

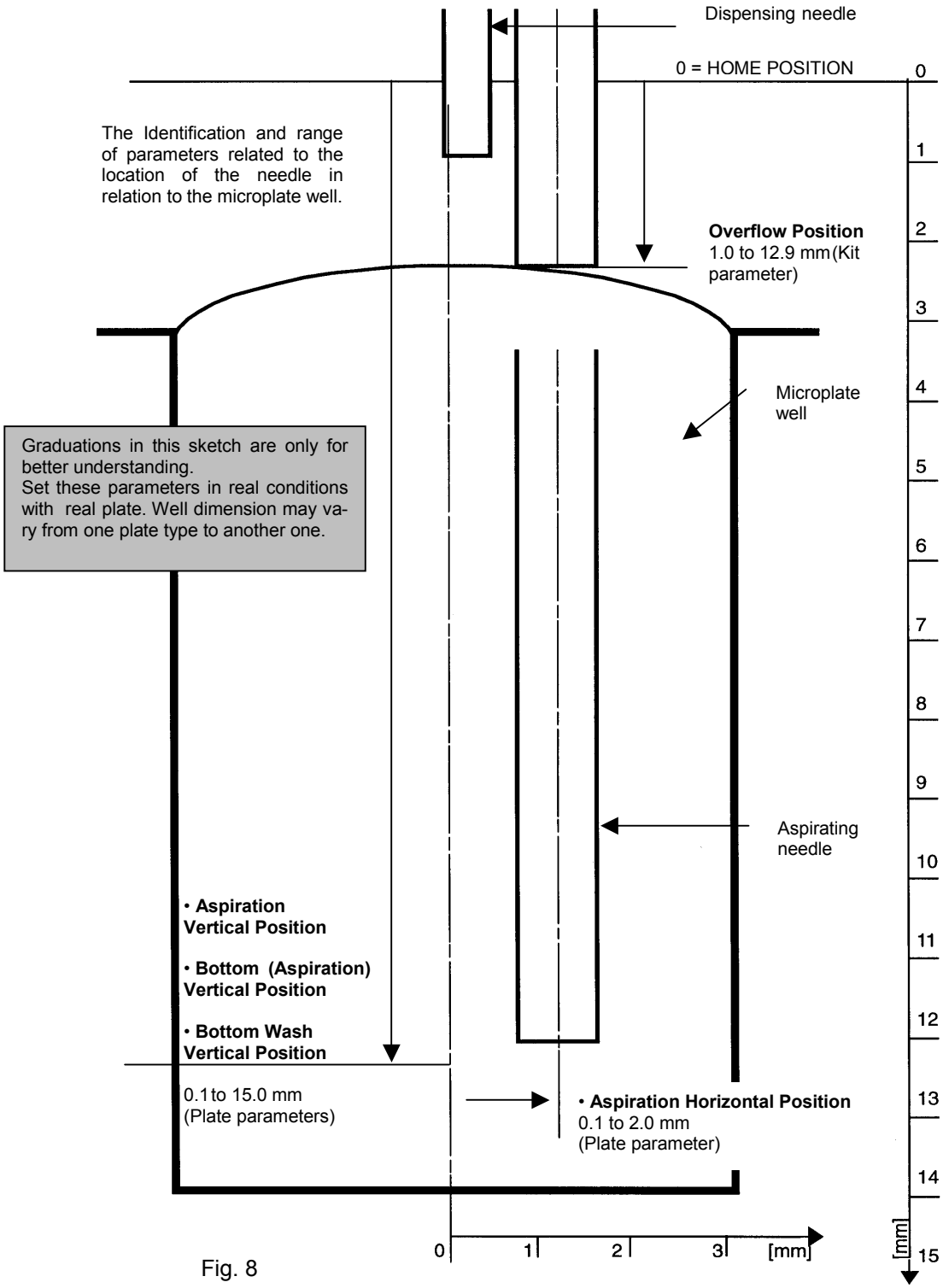


Fig. 8

2• INSTALLATION

2.1 Unpacking

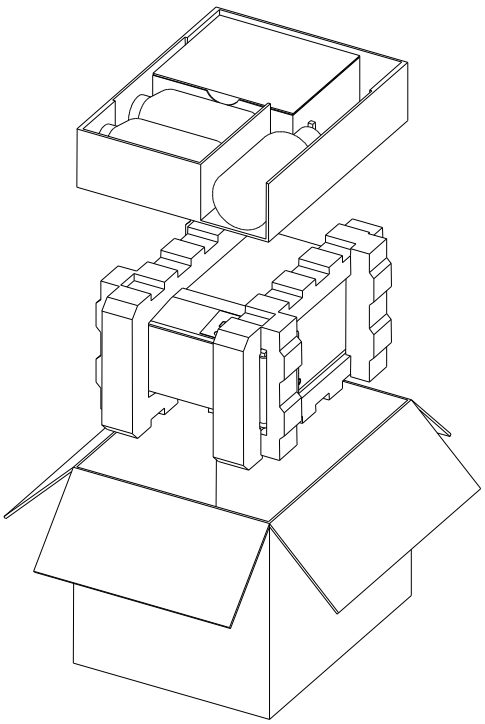


Fig.9

- **Carefully unpack accessories and washer.**

  IMPORTANT :
  Do not lift up the washer by pulling on the foam frames!

- First remove accessories at the top and beside the washer.

- Then, hold the washer (not the foams) and lift up.

- Remove the foams, remove plastic bag and place washer on a stable, horizontal surface.

- Slightly open aerosol cover and remove thin piece of foam (pull it down).

.

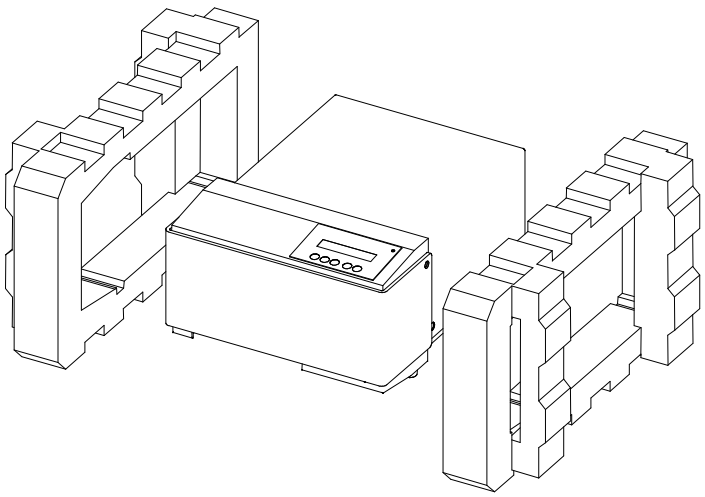


Fig.10

2.1 Unpacking (continued)

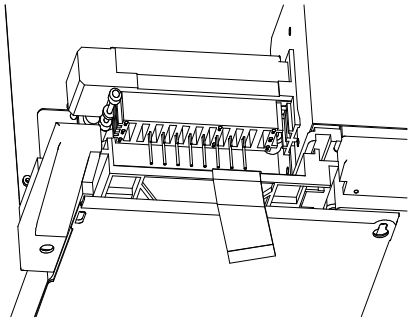


Fig. 11

- **In washer working area (Fig. 11, 12 & 13):**

-Remove adhesive tape blocking aerosol cover.
-Remove adhesive tape blocking plate carrier to bottom plate (fig. 11).

- **Pull and push plate carrier to check that it moves freely.**

- **Manifold**

-Remove the tie blocking the manifold on the left side (fig. 12) : push the tie to the left. Remove the tie from the vertical shaft.
- Turn blocking device as shown on fig. 12 and ensure to not hinder the manifold Up/Down motion.

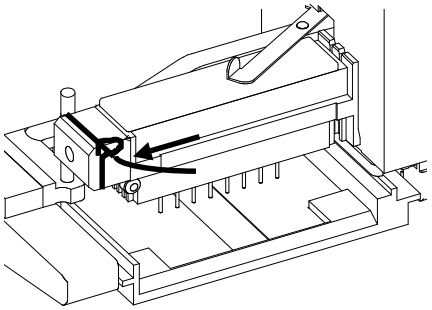


Fig. 12

- **On rear panel :**

Connect tubes on rear panel (match colours).

- **Vacuum pump protection :**

Cut yellow tube at halfway between WASTE bottle and washer and place hydrophobic filter (supplied in maintenace kit).

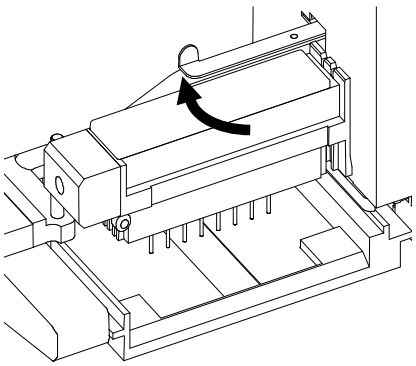


Fig. 13

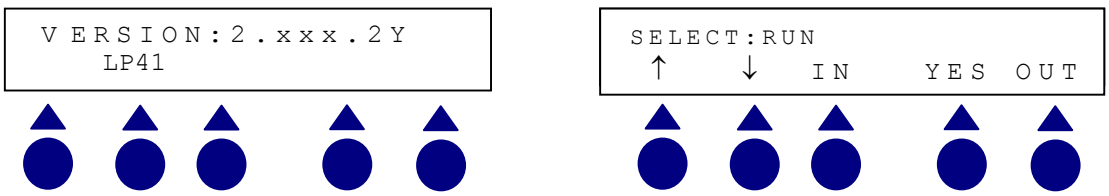
- **Connect power cord.**

Fuse installed : 2,5 A Slow Blow.
Plug Power Cord to mains socket; washer is equipped with universal input switch mode power supply (85 VAC to 264 VAC; 47 Hz to 440 Hz).

- **Turn the washer ON (ON/OFF switch on rear panel)**

Whereas plate carrier and manifold are moving to their home position, following message appears on display :

After initialization



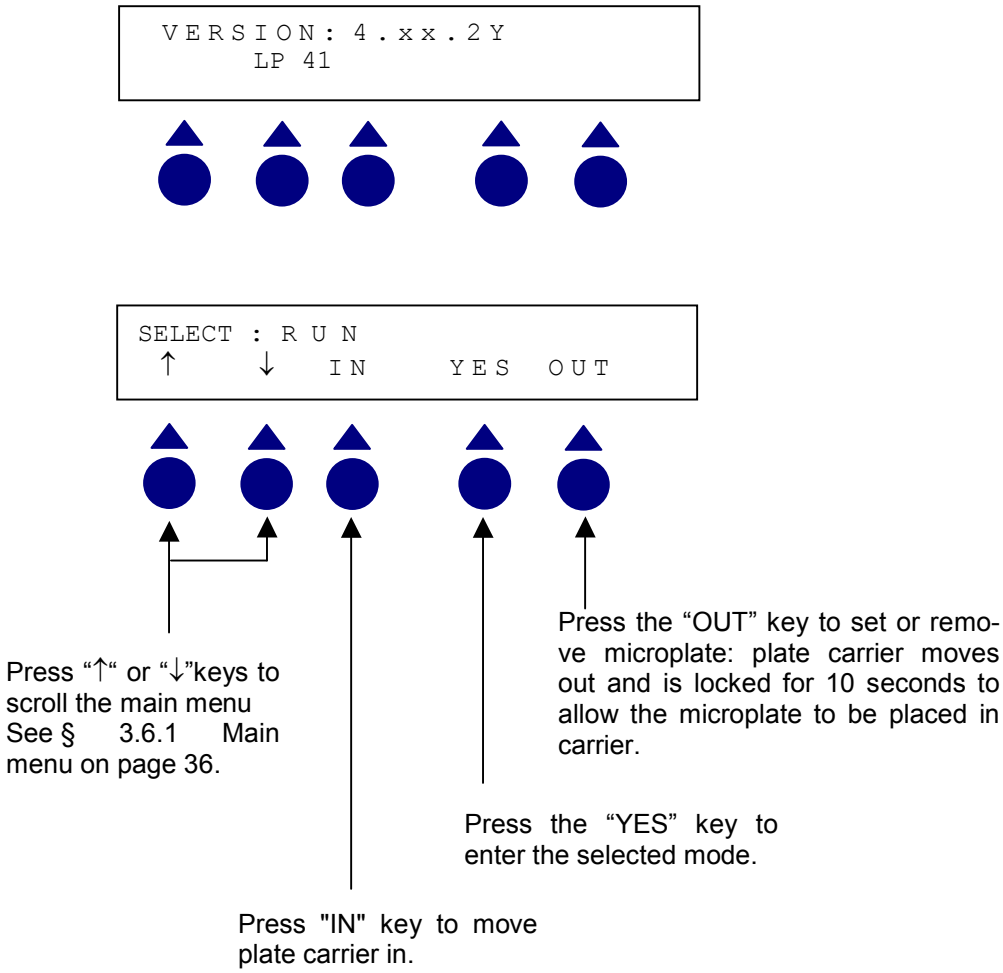
• Fill one RINSE bottle with demineralized water and prime the hydraulic circuit with at least 5 RINSE operations (see RINSE mode, § 3.5).

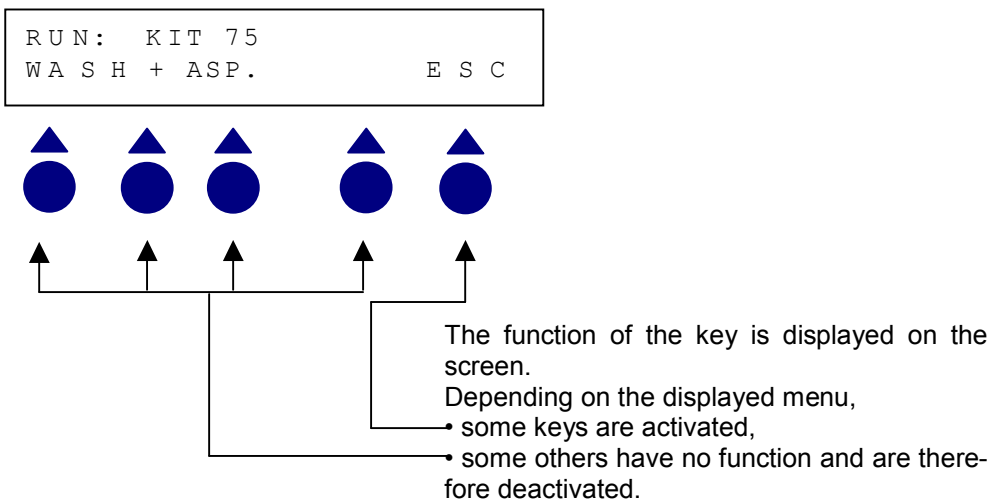
• The washer is ready for use.

3• OPERATING INSTRUCTIONS

3.1 Run Mode

3.1.1 How to use the Keyboard?


VERSION: 4.xx.2Y
LP 41
SELECT : RUN
↑ ↓ IN YES OUT
Press "↑" or "↓"keys to scroll the main menu
See § 3.6.1 Main menu on page 36.
Press the "OUT" key to set or remove microplate: plate carrier moves out and is locked for 10 seconds to allow the microplate to be placed in carrier.
Press the "YES" key to enter the selected mode.
Press "IN" key to move plate carrier in.


RUN: KIT 75
WASH + ASP. ESC
The function of the key is displayed on the screen.
Depending on the displayed menu,
• some keys are activated,
• some others have no function and are therefore deactivated.

3.2 Microplate loading

The plate carrier supports both 8- and 12-modes for processing 96-well microplates. Place the microplate on the plate carrier according to the mode selected :

Washer configurated in 8-mode (with 8-,2*8-, 3*8-Channel Manifold) :
One strip is made of 8 wells (numbered A to H)
Number of strips : 12 (numbered 1 to 12)

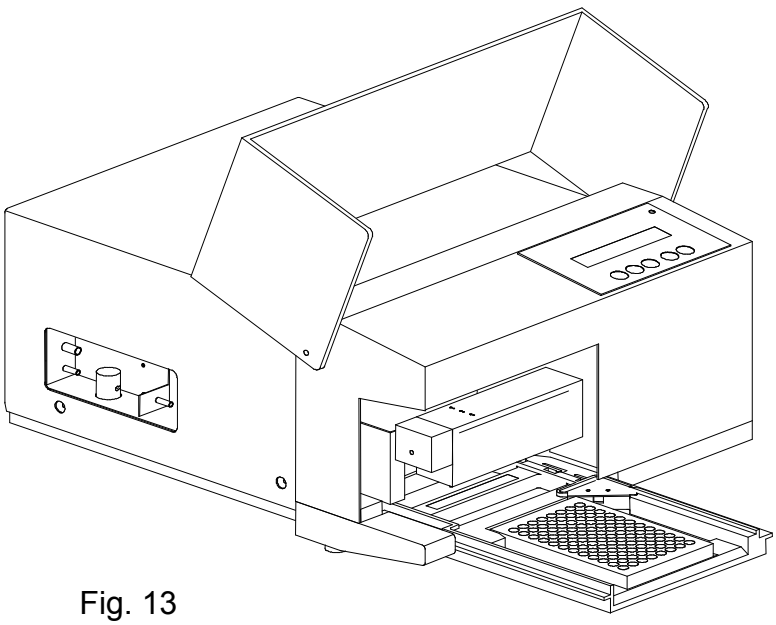
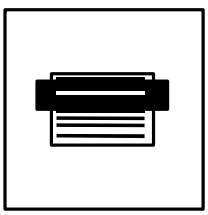


Fig. 13

Washer configurated in 12-mode (with 12-, 2*12-Channel Manifold) :
One strip is made of 12 wells (numbered 1 to 12)
Number of strips : 8 (numbered A to H)



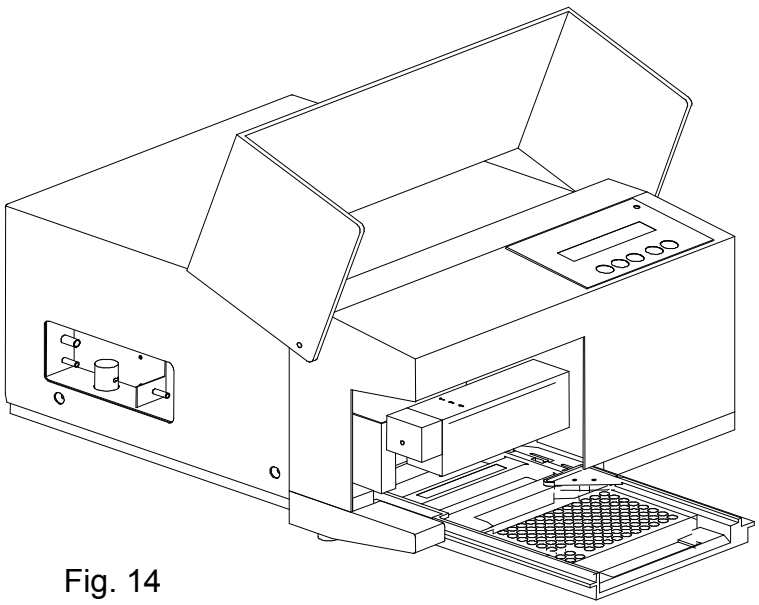
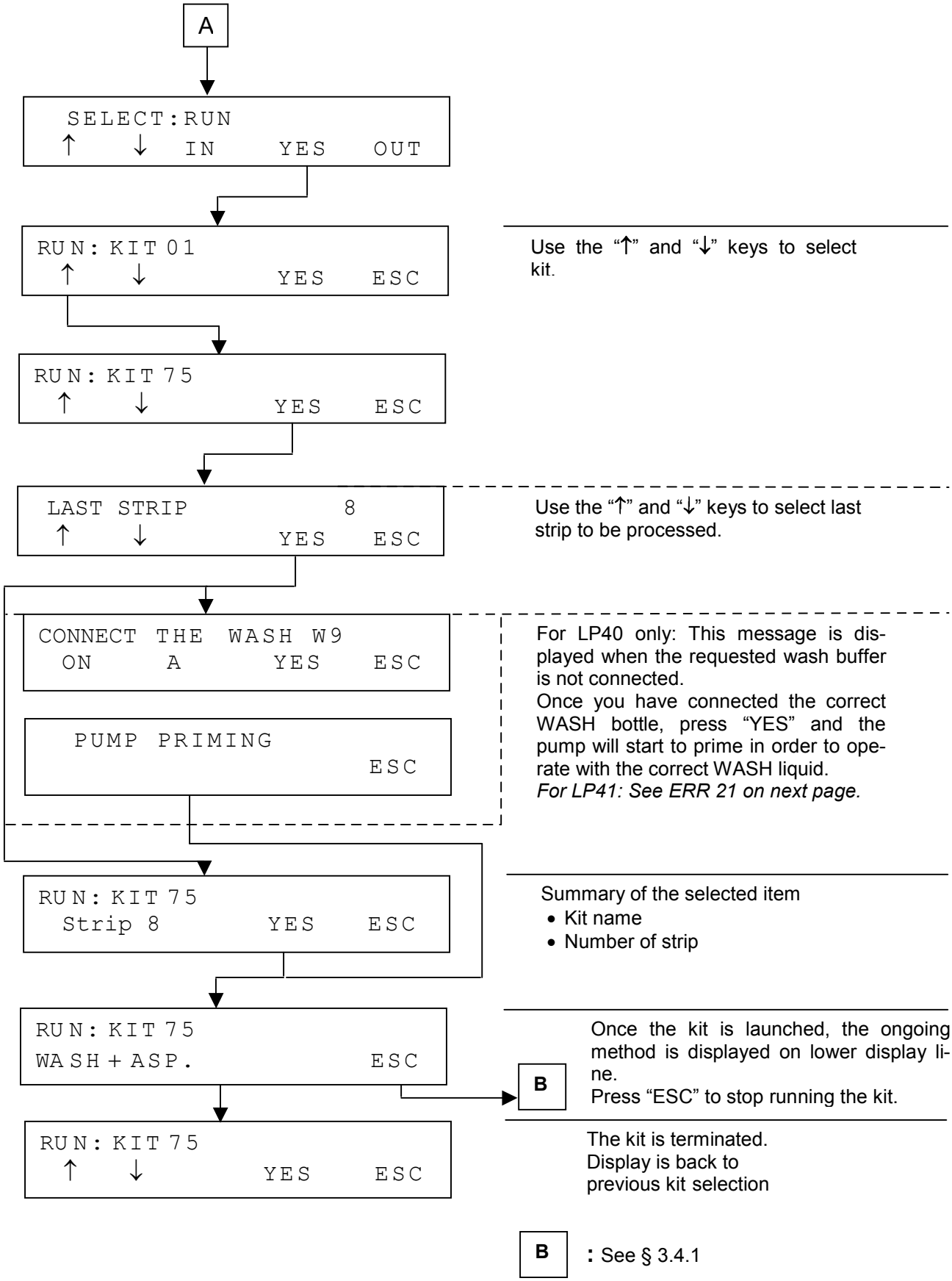


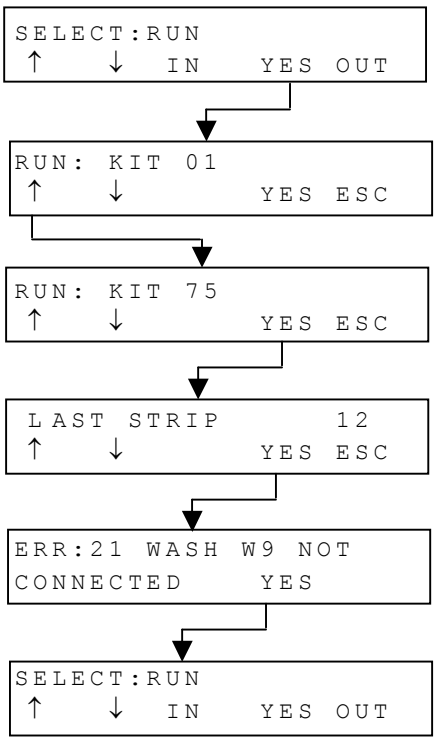
Fig. 14

3.3 Select one KIT


A
SELECT:RUN
↑ ↓ IN YES OUT
RUN: KIT 01
↑ ↓ YES ESC
RUN: KIT 75
↑ ↓ YES ESC
LAST STRIP 8
↑ ↓ YES ESC
CONNECT THE WASH W9
ON A YES ESC
PUMP PRIMING
ESC
RUN: KIT 75
Strip 8 YES ESC
RUN: KIT 75
WASH+ASP. ESC
B
RUN: KIT 75
↑ ↓ YES ESC
Use the "↑" and "↓" keys to select kit.
Use the "↑" and "↓" keys to select last strip to be processed.
For LP40 only: This message is displayed when the requested wash buffer is not connected.
Once you have connected the correct WASH bottle, press "YES" and the pump will start to prime in order to operate with the correct WASH liquid.
For LP41: See ERR 21 on next page.
Summary of the selected item
• Kit name
• Number of strip
Once the kit is launched, the ongoing method is displayed on lower display line.
Press "ESC" to stop running the kit.
The kit is terminated.
Display is back to previous kit selection
B : See § 3.4.1

3.3 Select one KIT (continued)

ERR:21 with LP41:

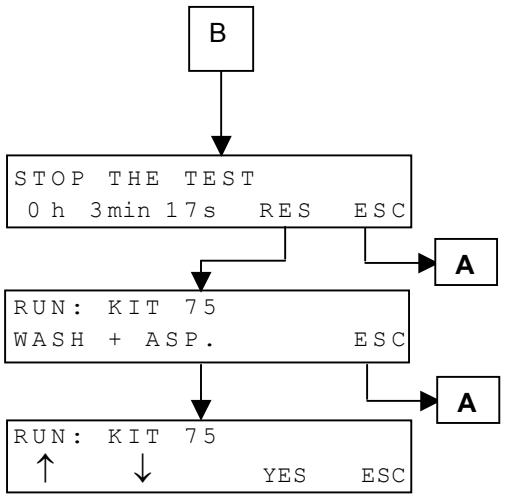


Error 21 indicates that Wash buffer W9 requested in "KIT 75" is not connected.
Connect Wash buffer W9 at input 1, 2 or 3.
Then enter washer CONFIGURATION to modify the input assignment accordingly (see § 3.6.2).

3.4 WASH interruption or Power Failure

3.4.1 WASH interruption

When the “ESC” key is pressed whereas a kit is running, the following message is displayed:

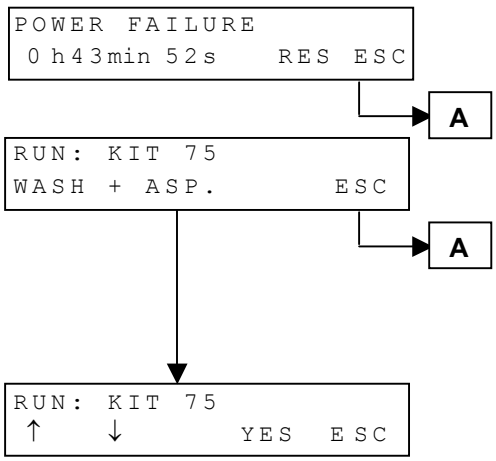


The elapsed time since the kit has been stopped is displayed.
Press the “RES” key to resume the kit at the point where it has been stopped or press the “ESC” key to go back to main menu.

A : Back to the main menu (see § 3.3).

3.4.2 POWER Failure

When a power failure occurs whereas a kit is running, the following message will be displayed when power is back :

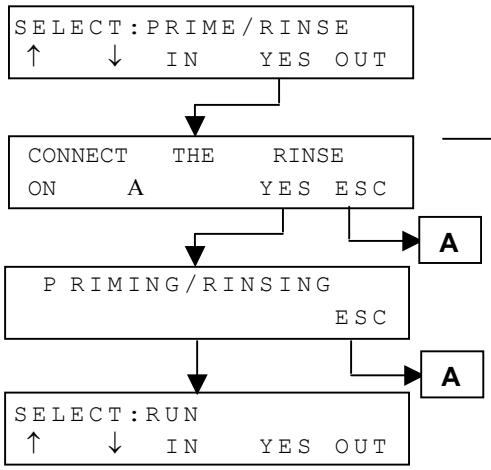


The elapsed time since the kit has been stopped is displayed.
Press the “RES” key to resume the kit at the point where it has been stopped or press the “ESC” key to go back to main menu.

A : Return to the main menu (see § 3.3).

3.5 RINSE

3.5.1 Rinse (with LP40)



Connect blue tube on RINSE bottle, ensure the plate carrier is not removed, then press “YES”.

A : Back to main menu (See § 3.3).

3.5.2 Please RINSE (with LP40)

The message

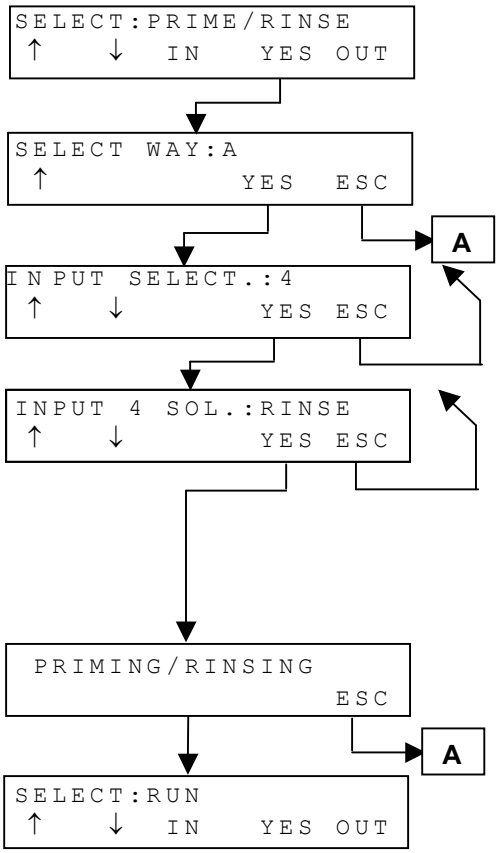
```
PLEASE RINSE
YES
```

Is displayed to incite user to perform a RINSE operation when the washer has not been used during 10 minutes after a WASH operation.
Press “YES” Key to go back to main menu and launch a RINSE.

IMPORTANT
The washer should never be switched off with the WASH solution inside the tubing and manifold.
Solid crystals from the dried WASH solution could clog the dispense needles and clamp the electrovalve tube.

3.5 RINSE (continued)

3.5.3 Rinse (with LP41)



Way is mandatory "A" on LP41.
Press YES to continue.

Select washer input according to the rinsing or priming that you want to do.

Indication of the liquid connected to the selected input. If you change the liquid, use "↑" or "↓" keys to modify input assignment (same as in the washer configuration on page 37).
Note
-Input 4 is mandatory RINSE.

A : Back to the main menu (See § 3.3).

3.5.4 Automatic Rinsing (whit LP41)

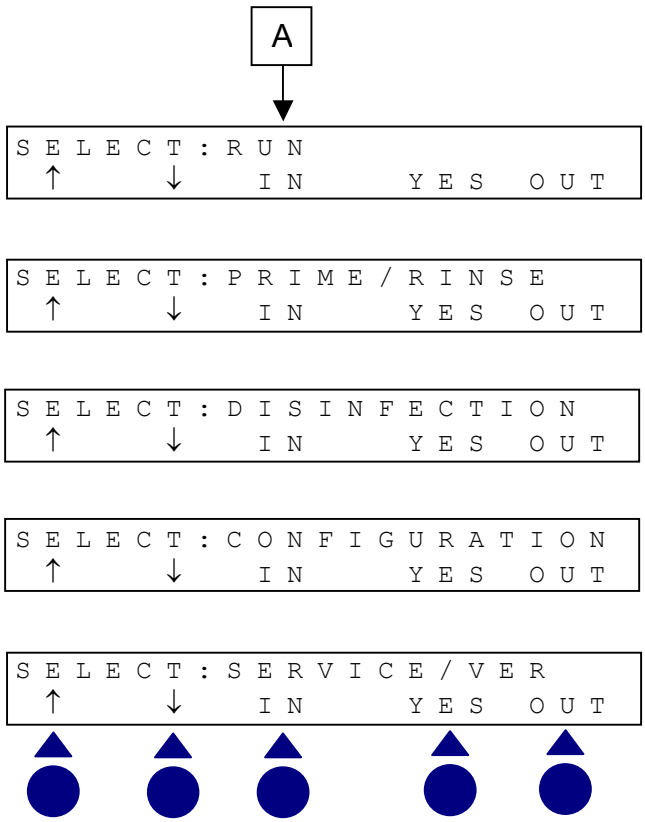
One automatic rinsing sequence will take place as soon as the time set in "RINSE PARAM." (see § 3.6.2. Washer's configuration) has elapsed after the last wash.

Note
When the washer won't be used for several days, it is recommended to connect all channels all inputs to rinse bottle and rinse every input as described above in order to clean the pinch valve tube of every input. See also § 4.1.2 Storage condition.

IMPORTANT
The washer should never be switched off with WASH solution inside tubing and manifold.
Solid crystals from the dried WASH solution could clog the dispense needles and clamp the electrovalve tube.

3.6 Configuration

3.6.1 Main menu


A
S E L E C T : R U N
↑ ↓ I N Y E S O U T
S E L E C T : P R I M E / R I N S E
↑ ↓ I N Y E S O U T
S E L E C T : D I S I N F E C T I O N
↑ ↓ I N Y E S O U T
S E L E C T : C O N F I G U R A T I O N
↑ ↓ I N Y E S O U T
S E L E C T : S E R V I C E / V E R
↑ ↓ I N Y E S O U T

RUN
See § 3.1Run Mode

PRIME/RINSE
See § 3.5 RINSE

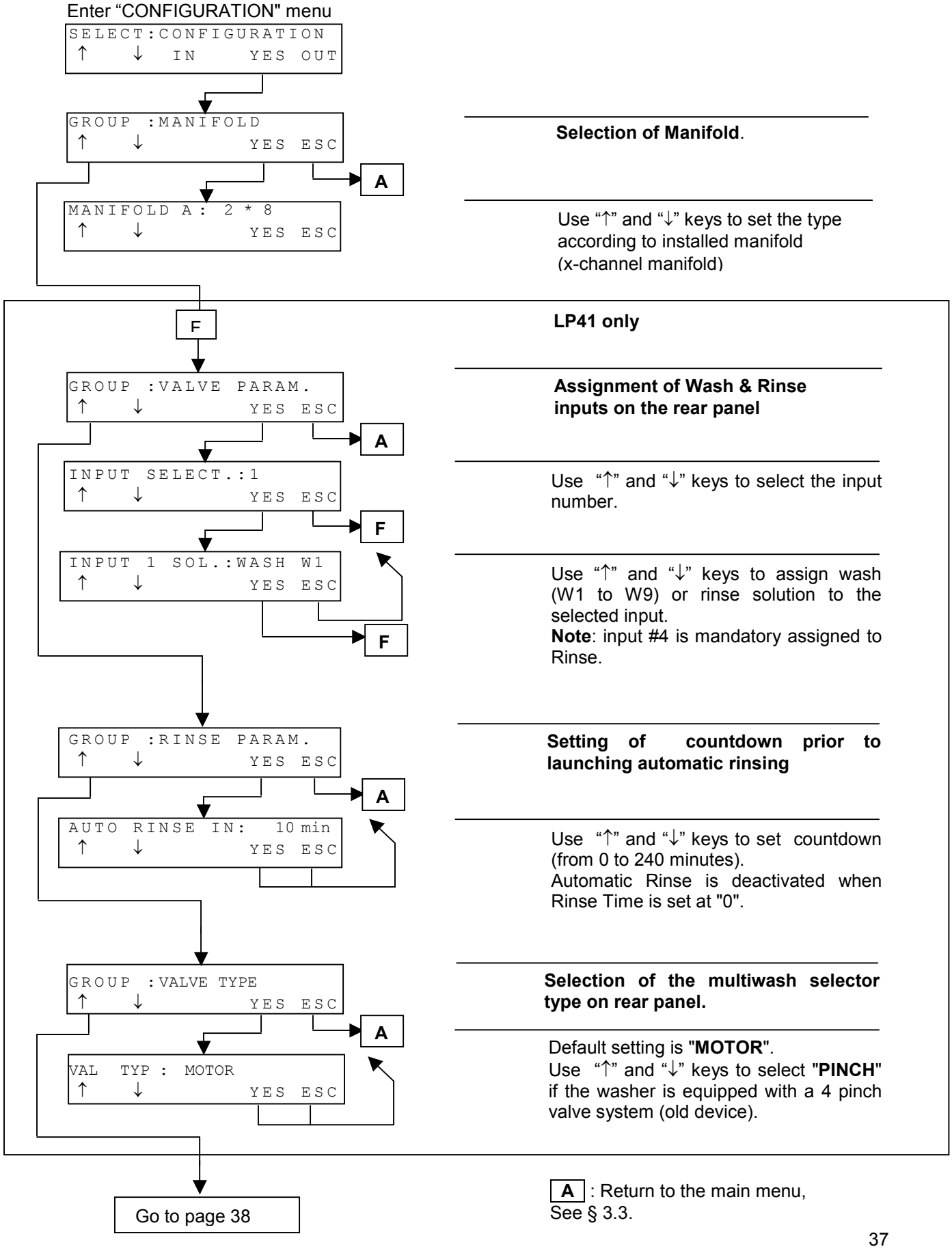
DISINFECTION
See § 4.2.2 DISINFECTION

CONFIGURATION
See § 3.6.2 Washer's configuration

SERVICE / VER
See § 4.3.1 Hardware and software version

3.6 Configuration (continued)

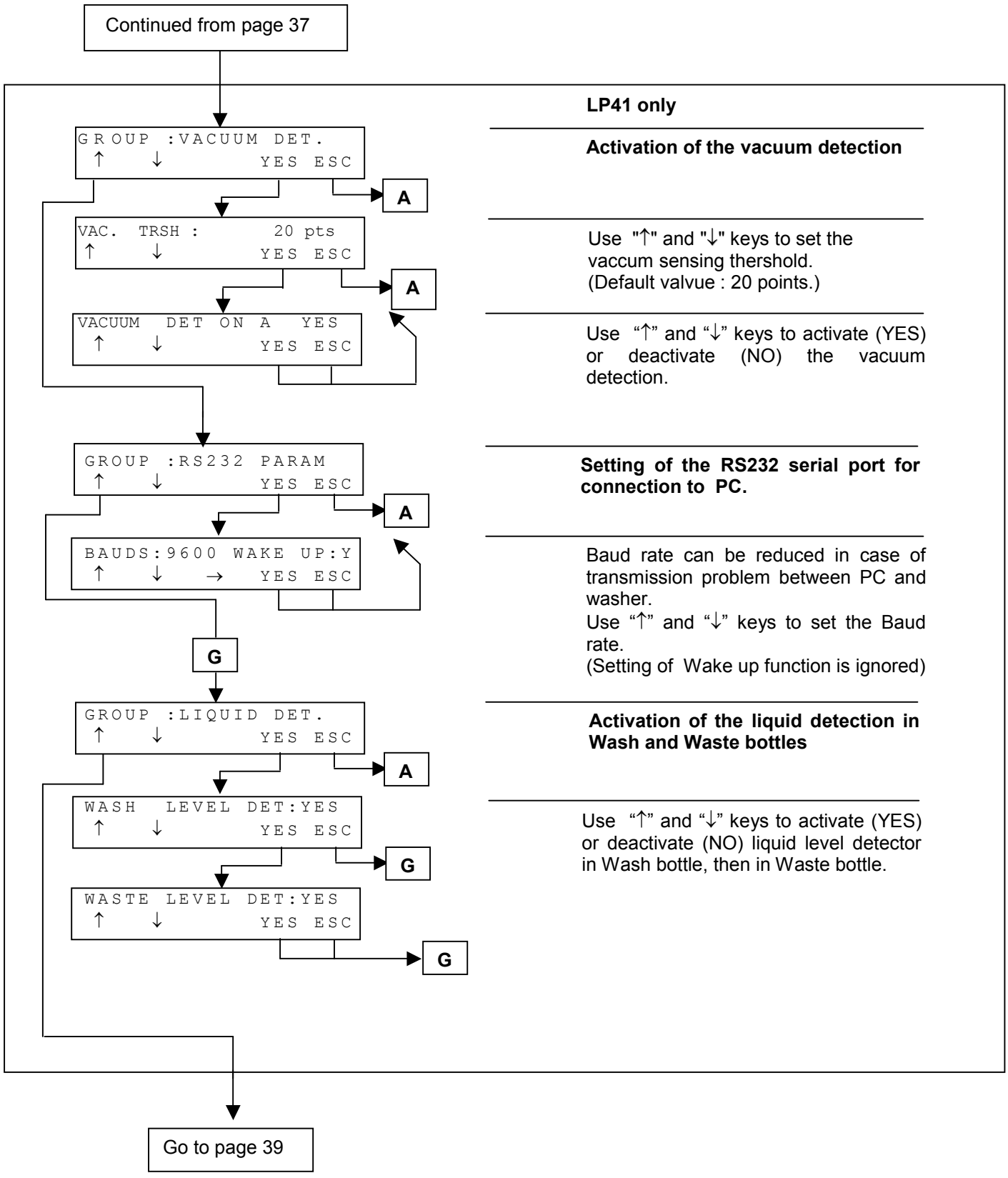
3.6.2 Washer's configuration


Enter “CONFIGURATION" menu
SELECT:CONFIGURATION
↑ ↓ IN YES OUT
GROUP :MANIFOLD
↑ ↓ YES ESC
A
MANIFOLD A: 2 * 8
↑ ↓ YES ESC
F
GROUP :VALVE PARAM.
↑ ↓ YES ESC
A
INPUT SELECT.:1
↑ ↓ YES ESC
F
INPUT 1 SOL.:WASH W1
↑ ↓ YES ESC
F
GROUP :RINSE PARAM.
↑ ↓ YES ESC
A
AUTO RINSE IN: 10 min
↑ ↓ YES ESC
GROUP :VALVE TYPE
↑ ↓ YES ESC
A
VAL TYP : MOTOR
↑ ↓ YES ESC
Selection of Manifold.
Use “↑” and “↓” keys to set the type according to installed manifold (x-channel manifold)
LP41 only
Assignment of Wash & Rinse inputs on the rear panel
Use “↑” and “↓” keys to select the input number.
Use “↑” and “↓” keys to assign wash (W1 to W9) or rinse solution to the selected input.
Note: input #4 is mandatory assigned to Rinse.
Setting of countdown prior to launching automatic rinsing
Use “↑” and “↓” keys to set countdown (from 0 to 240 minutes).
Automatic Rinse is deactivated when Rinse Time is set at "0".
Selection of the multiwash selector type on rear panel.
Default setting is "MOTOR".
Use “↑” and “↓” keys to select "PINCH" if the washer is equipped with a 4 pinch valve system (old device).
A : Return to the main menu, See § 3.3.

Go to page 38

3.6 Configuration (continued)

3.6.2 Washer's configuration (continued)



LP41 only

Activation of the vacuum detection

Use "↑" and "↓" keys to set the vaccum sensing thershold.
(Default valvue : 20 points.)

Use "↑" and "↓" keys to activate (YES) or deactivate (NO) the vacuum detection.

Setting of the RS232 serial port for connection to PC.

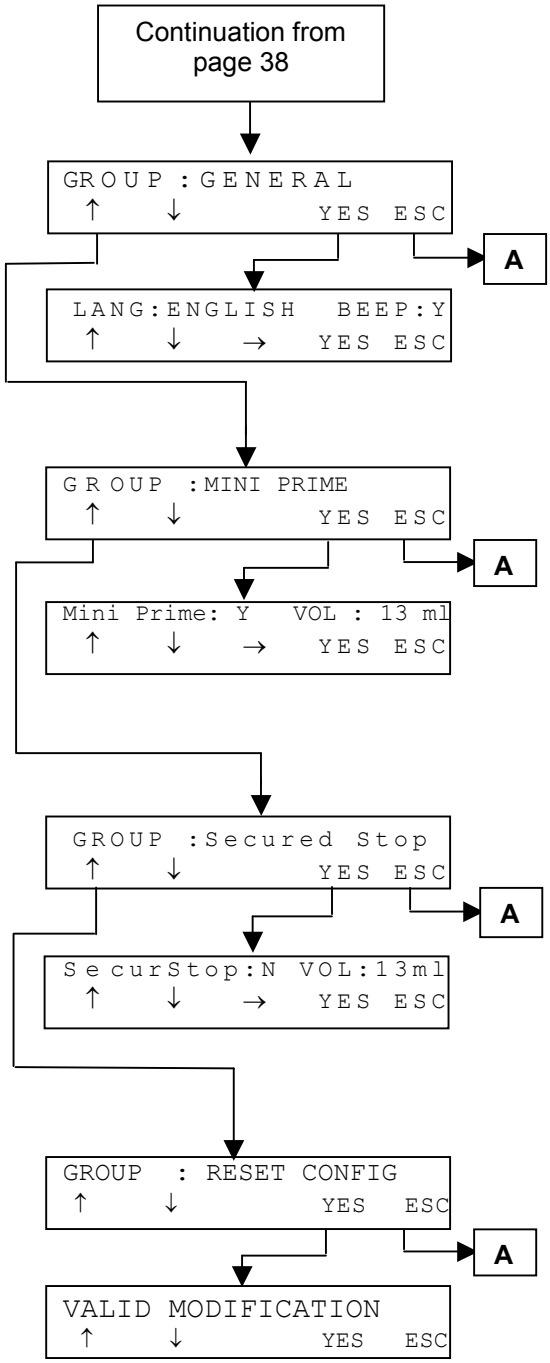
Baud rate can be reduced in case of transmission problem between PC and washer.
Use "↑" and "↓" keys to set the Baud rate.
(Setting of Wake up function is ignored)

Activation of the liquid detection in Wash and Waste bottles

Use "↑" and "↓" keys to activate (YES) or deactivate (NO) liquid level detector in Wash bottle, then in Waste bottle.

3.6 Configuration (continued)

3.6.2 Washer's configuration (continued)



Setting of dialogue interface parameters

Use "↑" and "↓" keys to set language, then "→" key and"↑" and "↓" keys to activate (Y) or deactivate (N) the Beep.

Activation of a mini priming sequence before every wash protocol.

Use "↑" and "↓" keys to activate (Y) or deactivate (N), then " →" key and "↑" and "↓" to set the volume from 1 to 30ml.

Activation of the secured stop after every wash protocol to remove air from manifold..

Use "↑" and "↓" keys to activate (Y) or deactivate (N), then " →" key and "↑" and "↓" to set the volume from 1 to 30ml.

Reboot all configurations's parameters

Press "Yes" key to valid the reinitialisation

A : Back to the main menu (see § 3.3).

3.7 PROGRAMMING

3.7.1 Kit Structure

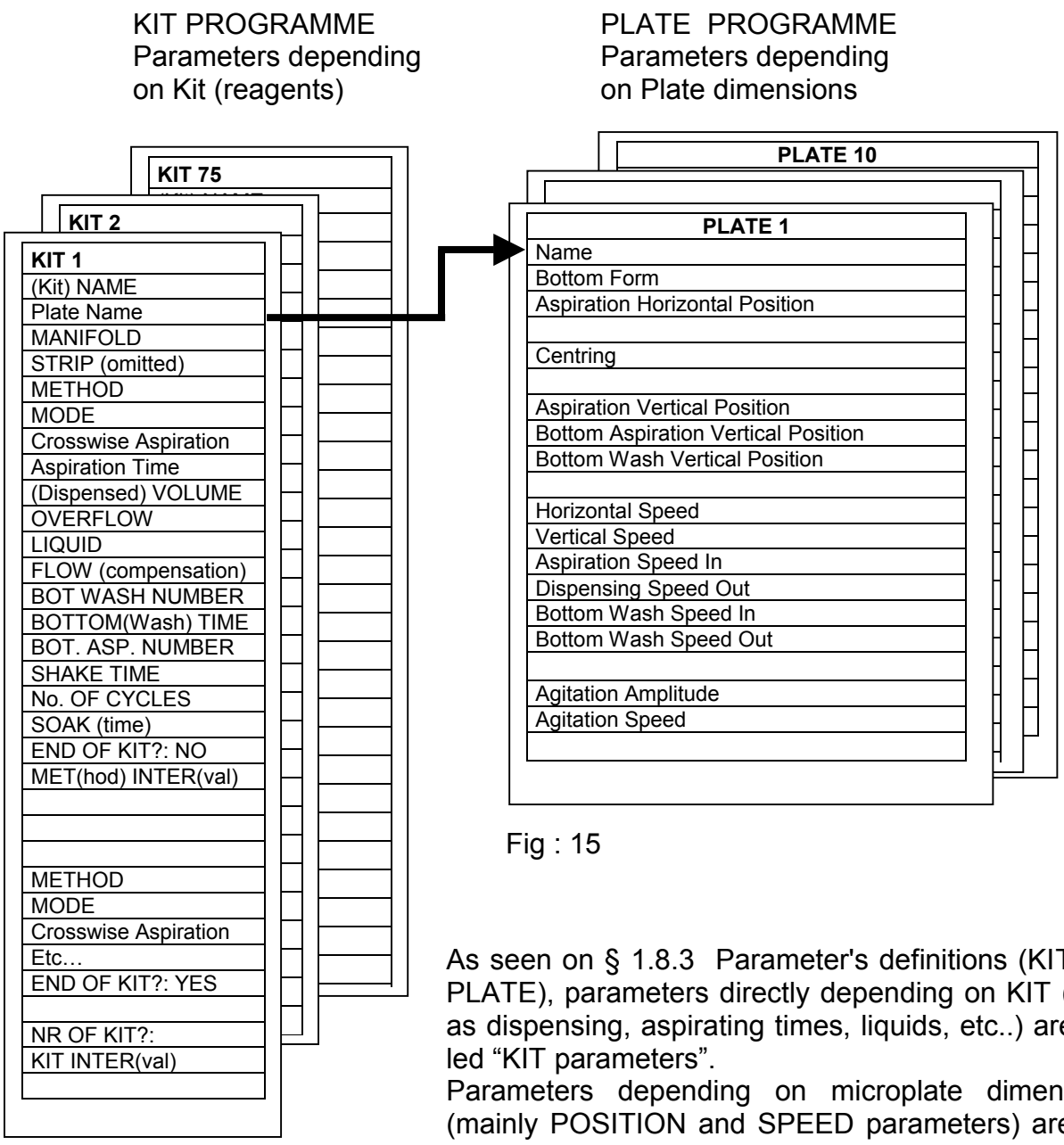


Fig : 15

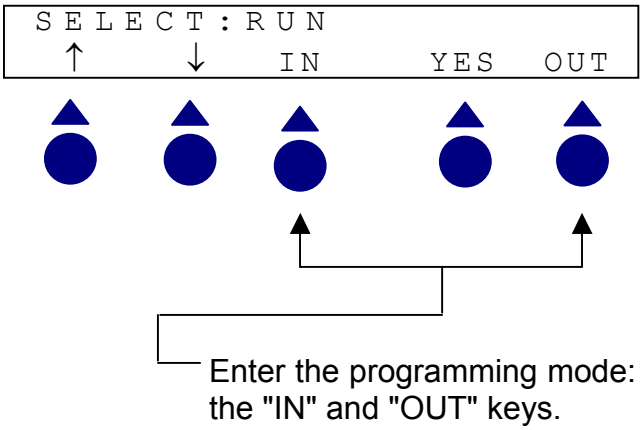
As seen on § 1.8.3 Parameter's definitions (KIT and PLATE), parameters directly depending on KIT (such as dispensing, aspirating times, liquids, etc..) are called “KIT parameters”.
Parameters depending on microplate dimensions (mainly POSITION and SPEED parameters) are called “PLATE parameters”.

At programming, each kit is mandatory linked to one plate with the “Plate number” parameter (Fig. 15).
This implies that the PLATE must be already existing or must be programmed **prior** the associated KIT is programmed.

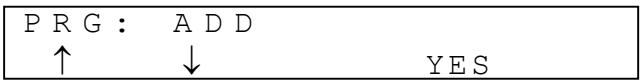
Up to 10 PLATES can be programmed.
Up to 75 KITS can be programmed.

3.7 PROGRAMMING (continued)

3.7.2 Access to PROGRAMMING mode



Enter the programming mode: press simultaneously the "IN" and "OUT" keys.



3.7 PROGRAMMING (continued)

3.7.3 Programming Synopsis

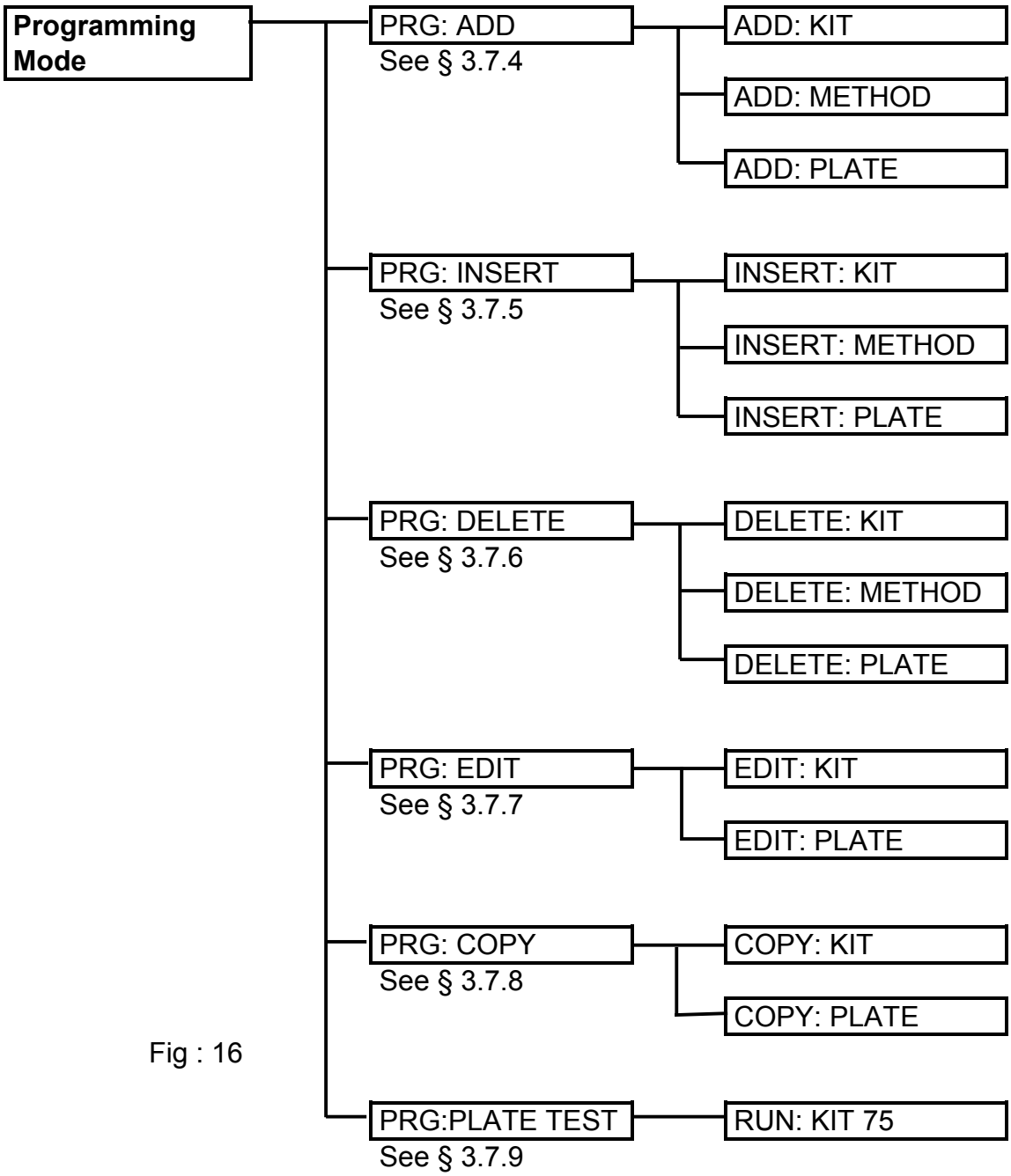


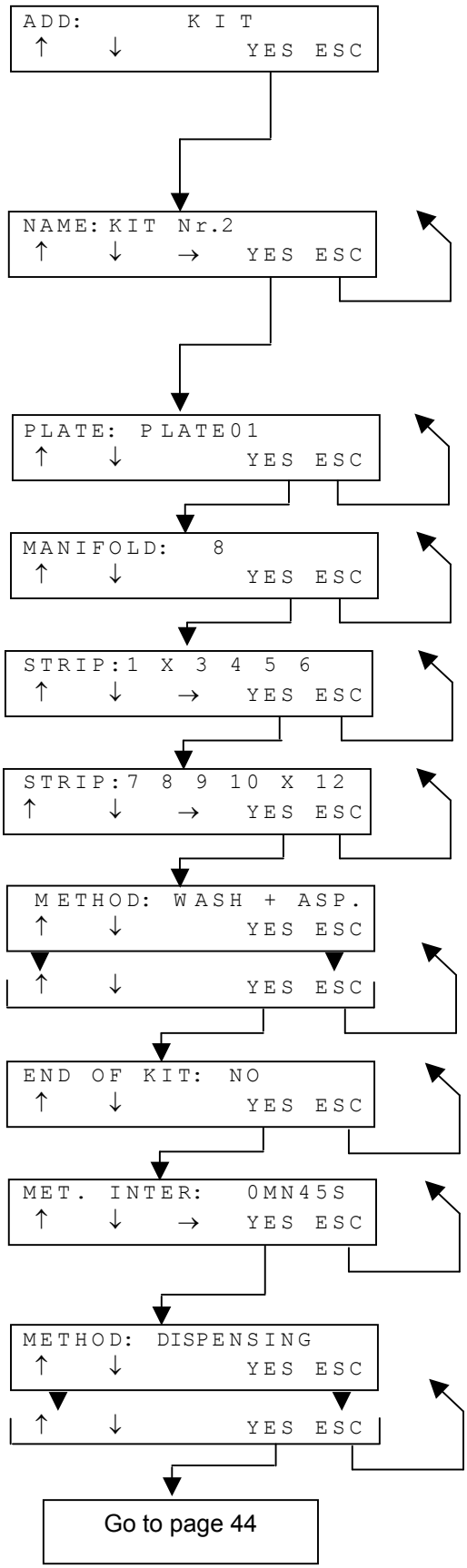
Fig : 16

3.7 PROGRAMMING (continued)

3.7.4 ADD

3.7.4.1 ADD: KIT

The kit is added at the end of the existing kit list



Go to page 44

- Use "↑" and "↓" keys to scroll the available menu.
- Press "YES" key to initiate the displayed selection.
- Press "ESC" key to escape and go back to former prompt.

Enter the kit name: select character with "↑" and "↓" keys, then press "→" key to move to next character (up to 15 characters).

Select the plate to be associated to kit.

Select manifold type :
LP40 : 8- or 12-channels
LP41 : 8-, 2*8-, 3*8- or 12-, 2*12-channels.

Omit strip : place cursor on strip with "→" key, then press "↑" or "↓" key to have strip omitted ("X").
In RUN mode, the omitted strips will never be processed.

Select the first method of kit.
See method parameter selection on § 3.7.4.3.

Answer "NO" in order to add another method.

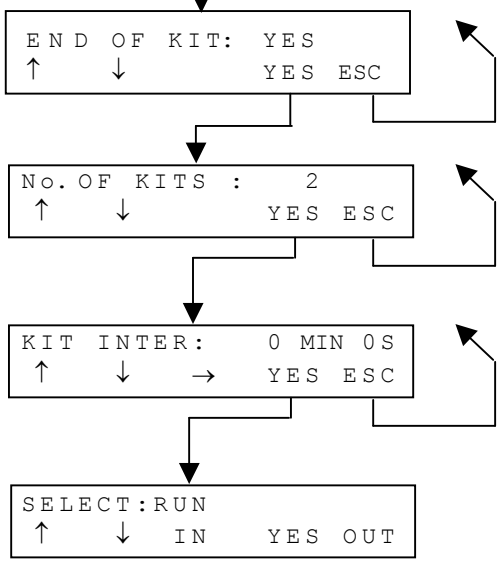
Set "Method interval" with "↑" or "↓" and the "→" keys.
(from 0 min 0 s up to 59 min 0 s).

3.7 PROGRAMMING (continued)

3.7.4 ADD (continued)

3.7.4.1 ADD : KIT (continued)

Continued from page 43



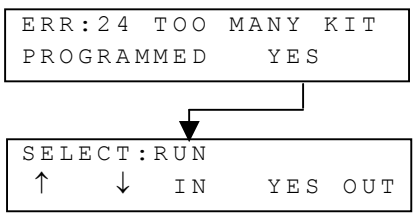
Answer "YES" when no more methods have to be added.

Select the Nr. of times the kit has to be run with "↑" or "↓"keys (up to 9 times).

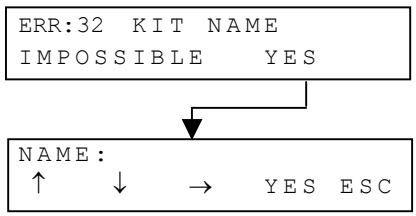
When run more than once, set "Kit interval" with "↑" or "↓" and "→"keys.
(from 0 min 0 s up to 59 min 59 s).

The new kit is added to the end of the existing kit list.
Display is back to main menu.

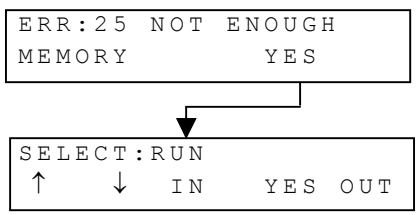
3.7.4.2 ERRORS in KIT programming



75 kits are already programmed! You must first delete an existing kit programming a new one.



The name or the kit name you have entered is already existing. Enter a new name to continue kit programming.



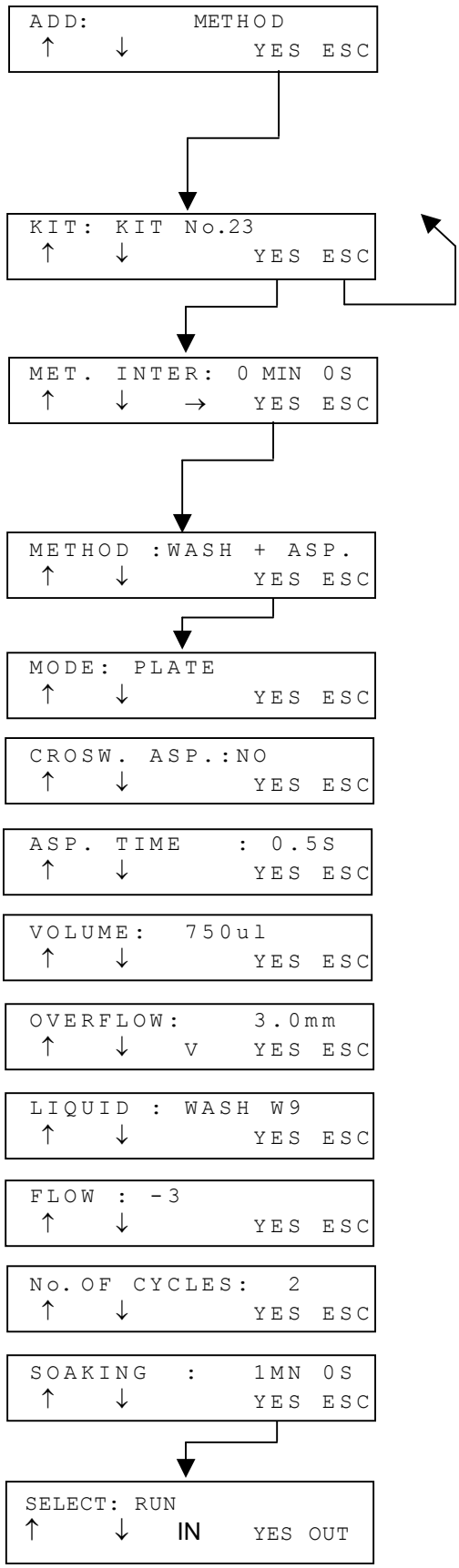
Memory is full because one or several kits are containing a large number of methods.
You must first delete an existing kit prior programming a new one.

3.7 PROGRAMMING (continued)

3.7.4 ADD (continued)

3.7.4.3 ADD: METHOD

The method is added after the last method of the selected kit



• Use "↑" and "↓" keys to scroll the available menu.
• Press "YES" key to initiate the displayed selection.
• Press "ESC" key to escape and go back to former prompt.

Select kit to which you want to add a method with the "↑" and "↓" keys.

Set “Method interval” between last existing method and added method with “↑” or “↓” and “→” keys.
(from 0 min 0 s up to 59 min 0 s).

Select the method to be added

Set kit parameters associated to selected method.
See table next page and kit parameter definition § 1.8.3

Press “V” key to show the modification at the real time. To go out from this mode, just press “V” key again.
This mode can be kept during all the steps of modifications

Only the first cycle is played “n” times (here twice) for a “two-cycle” method such as Wash + Asp (nW + A).

3.7 PROGRAMMING (continued)

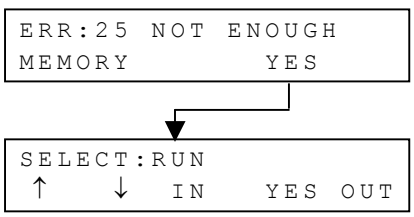
3.7.4 ADD (continued)

3.7.4.3 ADD: METHOD (continued)

Summary of kit parameters associated to method.

METHOD:			WASH + ASP.	WASH+ BOT. ASP	BOT.WASH + ASP	BOT.WASH + BOT ASP	WASH	ASPIRATION	DISPENSING	BOTTOM WASH.	BOTTOM ASP.	AGITATION
Method Code:			**nW+ A**	**NW+ a**	**nw+ A**	**Nw+a**	**nW**	**nA**	**nD**	**nw**	**na**	**nAg**
Kit Parameter	**Value**	See def.										
MODE:	STRIP or PLATE	p . 16	*	*	*	*	*	*	*	*	*	*
CROS. ASP.:	YES or NO	p . 18	*	*	*	*	*	*		*	*	
ASP. TIME:	0.1 to 9.9 s.	p . 18	*	*	*	*	*	*		*	*	
VOLUME:	50 to 3000 ul	p . 19	*	*	*	*	*		*	*		
OVERFLOW:	1.0 to 12.9 mm	p . 19	*	*	*	*	*		*	*		
LIQUID:	Wash W1 to Wash W9	p . 19	*	*	*	*	*		*	*		
FLOW:	-5 to +5	p . 19	*	*	*	*	*		*	*		
BOT. WASH NUMBER:	1 or 2	p . 22			*	*				*		
BOTTOM TIME:	0.1 to 9.9 s.	p . 22			*	*				*		
BOT. ASP. NUMBER:	1 or 2	p . 23		*		*					*	
SHAKE TIME:	0.1 to 59.9 s.	p . 25										*
No. OF CYCLES:	1 to 9	p . 17	*	*	*	*	*	*	*	*	*	*
SOAKING:	0 to 59 min. in PLATE mode 0 to 9.9 s. in STRIP mode	p . 17	*	*	*	*	*	*	*	*	*	*

3.7.4.4 ERRORS on METHOD programming



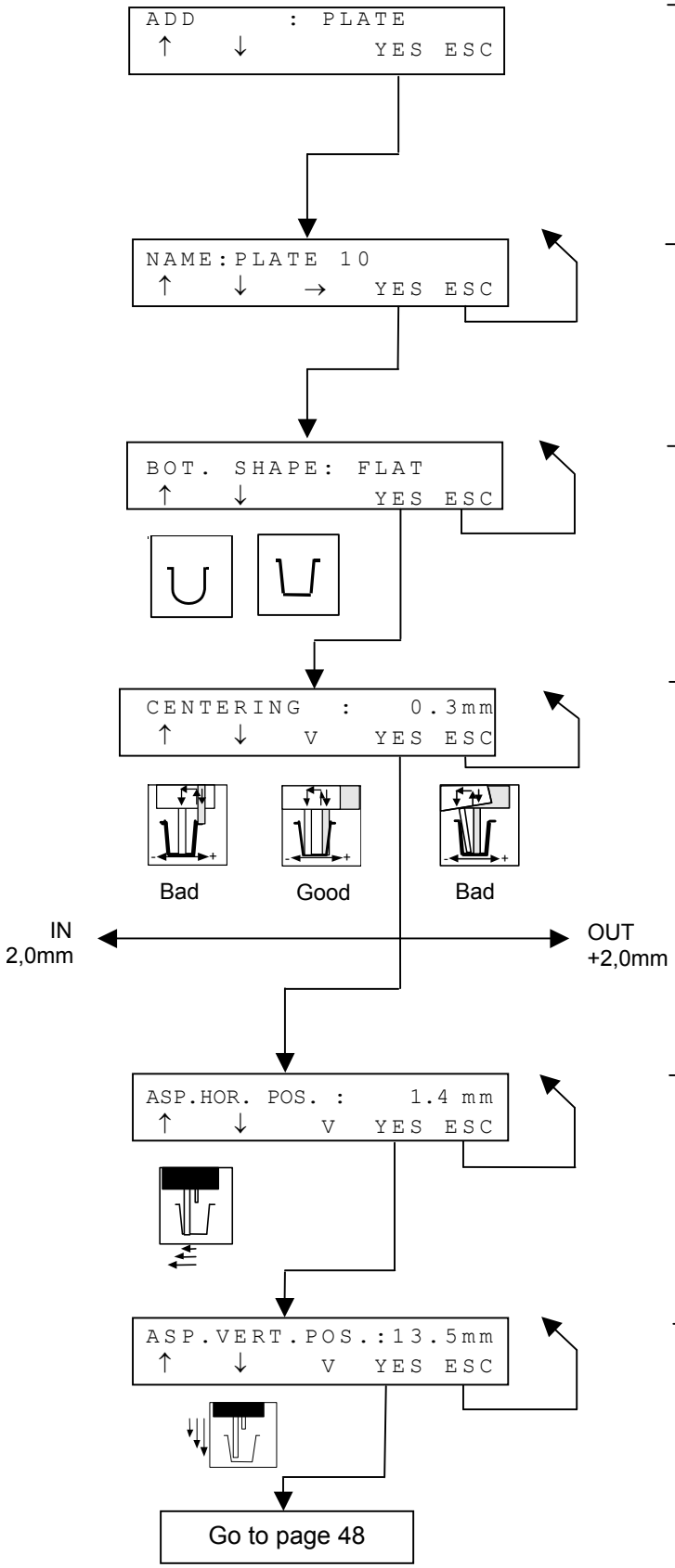
Memory is full because one or several kits are containing a large number of methods.
You must first delete an existing kit or existing method prior programming a new one.

3.7 PROGRAMMING (continued)

3.7.4 ADD (continued)

3.7.4.5 ADD: PLATE

The plate is added at the end of the existing plate list



• Use "↑" and "↓" keys to scroll the available menu.
• Press "YES" key to initiate the displayed selection.
• Press "ESC" key to escape and go back to former prompt.

Enter plate name: select character with "↑" and "↓" keys, then press the "→" key to move to next character (up to 8 characters).

Indicate well bottom shape:
FLAT or CURVED

Press "V" key to show the modification at the real time. To go out from this mode, just press "V" key again.
This mode can be kept during all the steps of modifications
Centring of the µplate wells relatively to manifold needle in the In/Out direction
-2.0 mm (IN) to +2.0 mm (OUT), step 0.1 mm.
Important parameter when a crosswise aspiration must be made close to the wall of wells.

Aspiration Horizontal Position
(for FLAT bottom only).
See definition on para 1.8.3.

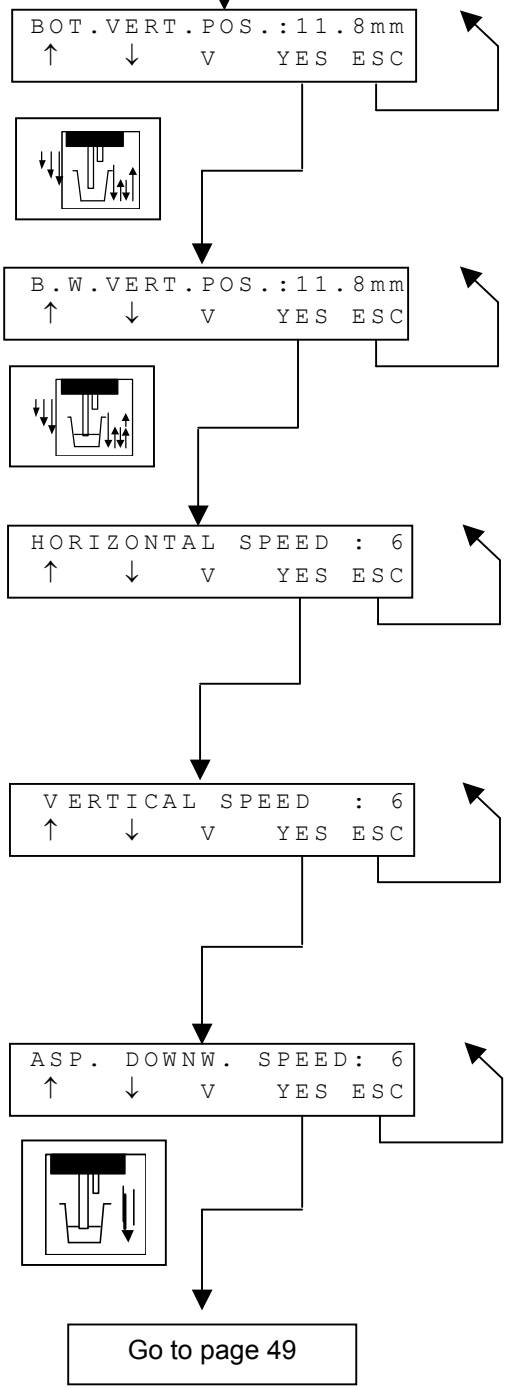
Aspiration Vertical Position.
See definition on para 1.8.3.

3.7 PROGRAMMING (continued)

3.7.4 ADD (continued)

3.7.4.5 ADD: PLATE (continued)

Continued from page 47



Bottom (aspiration) Vertical Position.
See definition on para 1.8.3.

Bottom Wash Vertical Position.
See definition on para 1.8.3.

Horizontal Speed:
In/Out plate carrier speed during non work movements.
(movement to home position, return movement from last to first strip etc..).
0 to 9, step 1.
(speed min. = 0; speed max. = 9)

Vertical speed:
Up / Down manifold speed during non work movements.
(movement to home position, etc...).
0 to 9, step 1.
(speed min. = 0; speed max = 9)

Aspiration Downward Speed.
See definition on para 1.8.3.

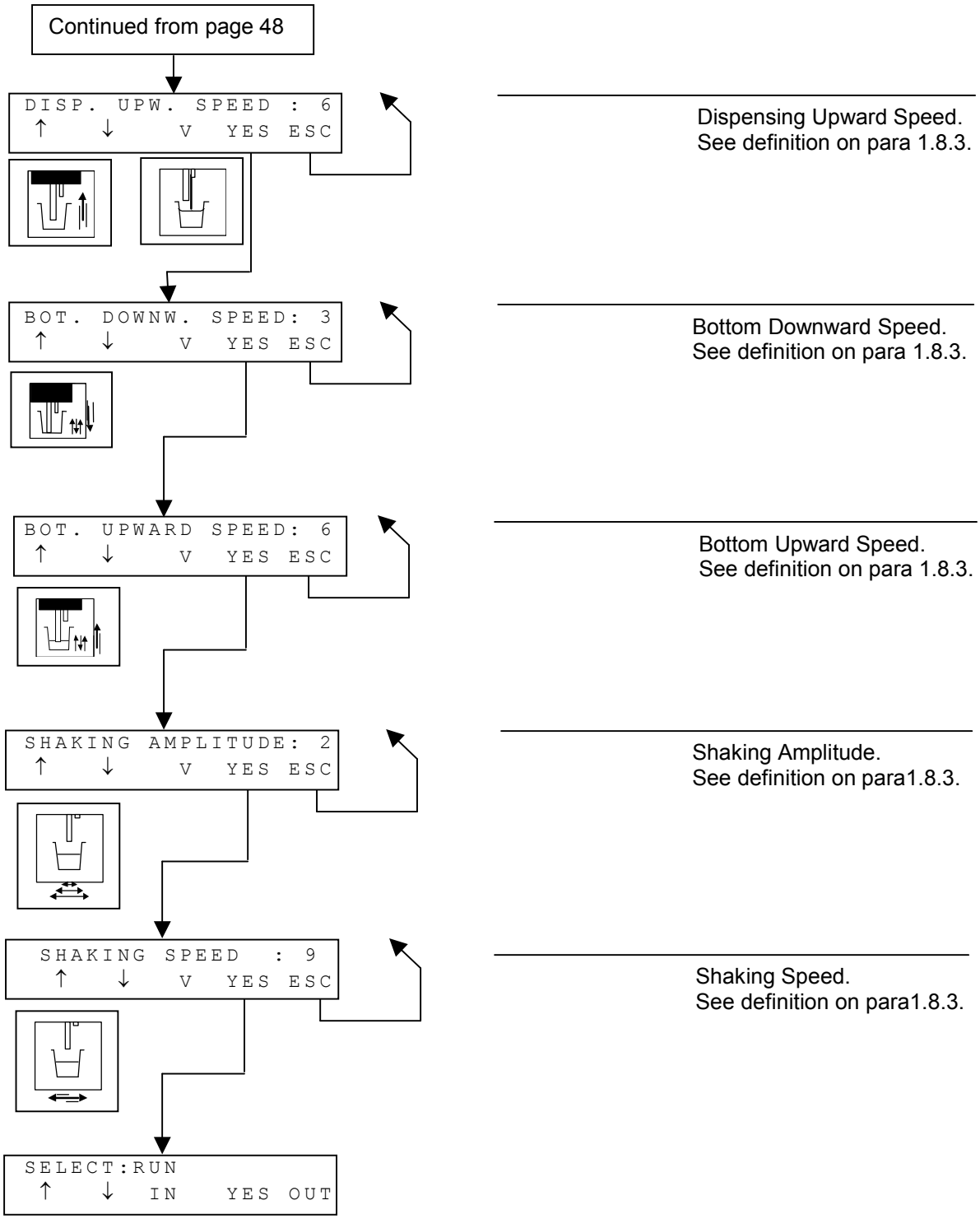
Go to page 49

3.7 PROGRAMMING (continued)

3.7.4 ADD (continued)

3.7.4.5 ADD: PLATE (continued)

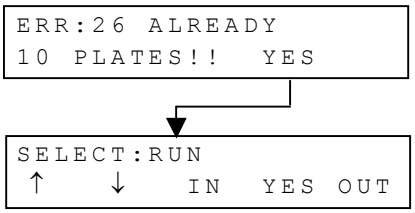
Continued from page 48


DISP. UPW. SPEED : 6
↑ ↓ V YES ESC
Dispensing Upward Speed.
See definition on para 1.8.3.
BOT. DOWNW. SPEED: 3
↑ ↓ V YES ESC
Bottom Downward Speed.
See definition on para 1.8.3.
BOT. UPWARD SPEED: 6
↑ ↓ V YES ESC
Bottom Upward Speed.
See definition on para 1.8.3.
SHAKING AMPLITUDE: 2
↑ ↓ V YES ESC
Shaking Amplitude.
See definition on para1.8.3.
SHAKING SPEED : 9
↑ ↓ V YES ESC
Shaking Speed.
See definition on para1.8.3.
SELECT:RUN
↑ ↓ IN YES OUT

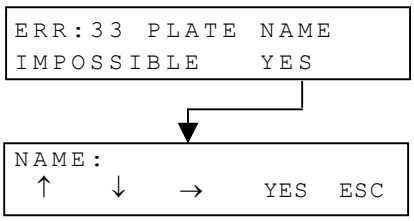
3.7 PROGRAMMING (continued)

3.7.4 ADD (continued)

3.7.4.6 ERRORS on PLATE programming



10 plates are already programmed! You must first delete an existing plate prior to programming a new one.



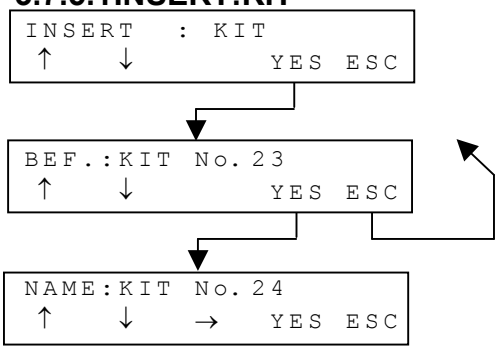
You have entered no name or the plate name you have entered is already existing. You are prompted to enter a new name to continue plate programming.

3.7 PROGRAMMING (continued)

3.7.5 INSERT

3.7.5.1 INSERT:KIT

The new kit is inserted **before** another kit



Select kit **before** which you want to insert new kit.

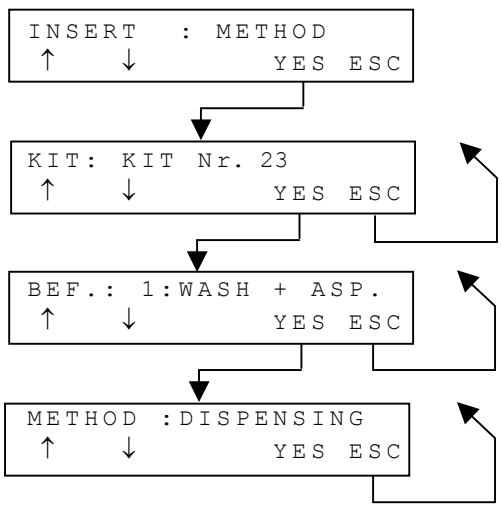
Enter new kit name.
Then, same procedure as in § 3.7.4.1 ADD:KIT.

3.7.5.2 TEMPORARY KIT

Power failure or erroneous OFF switching during KIT insertion will cause the kit to be lost unless the first method has been completely programmed. In this case the completely programmed methods can be found in a kit named “TEMPORARY KIT”. This kit is always inserted at the first place of the kit list. It is then possible to COPY this Temporary Kit and write its correct name, then continue with programming of next methods and kit repetition parameters.
Once saved under its correct name, it is highly recommended to DELETE the TEMPORARY KIT.

3.7.5.3 INSERT : METHOD

The new method is inserted **before** another method



Select kit where a method has to be inserted.

Select method **before** which the new method has to be inserted.

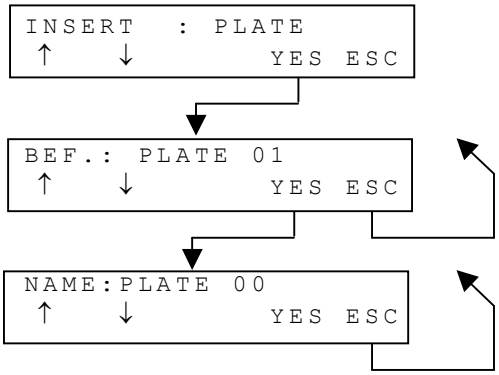
Enter the new method name.
Then, same procedure as in § 3.7.4.3 ADD:METHOD

3.7 PROGRAMMING (continued)

3.7.4 INSERT (continued)

3.7.5.4 INSERT: PLATE

The new kit is inserted **before** another plate



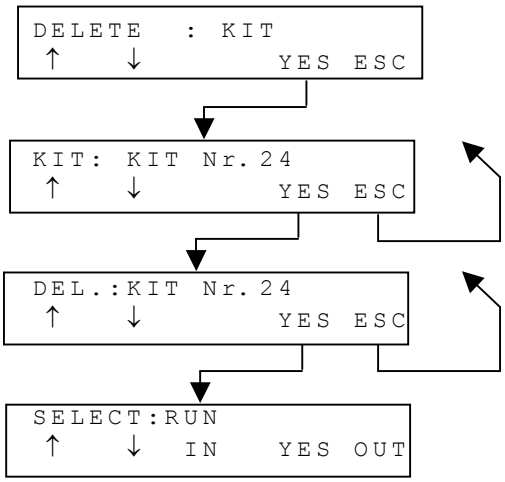
Select the plate **before** which the new plate has to be inserted.

Enter new method name.
Then, same procedure as in parameter 3.7.4.5 ADD: PLATE.

3.7 PROGRAMMING (continued)

3.7.6 DELETE

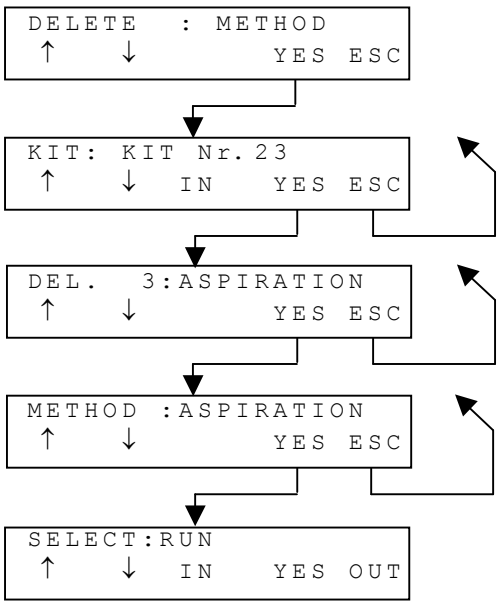
3.7.6.1 DELETE:KIT



Select kit to be deleted.

Press “YES” key to confirm kit is deleted or press “ESC” key to escape.

3.7.6.2 DELETE: METHOD



Select kit to which you want to delete a method.

Select the method to be deleted.

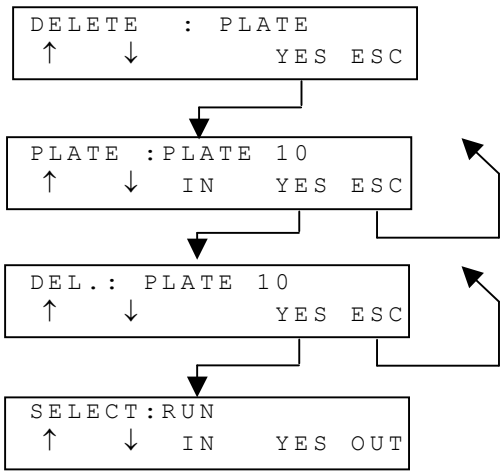
Press “YES” key to confirm method is deleted or press “ESC” key to escape.

Note
Deleting the method in a “one-method” kit is equivalent to delete this kit.

3.7 PROGRAMMING (continued)

3.7.6 DELETE (continued)

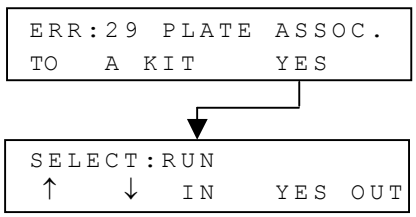
3.7.6.3 DELETE: PLATE



Select plate to be deleted.

Press “YES” key to confirm plate is deleted or press “ESC” key to escape.

3.7.6.4 ERROR in PLATE deletion

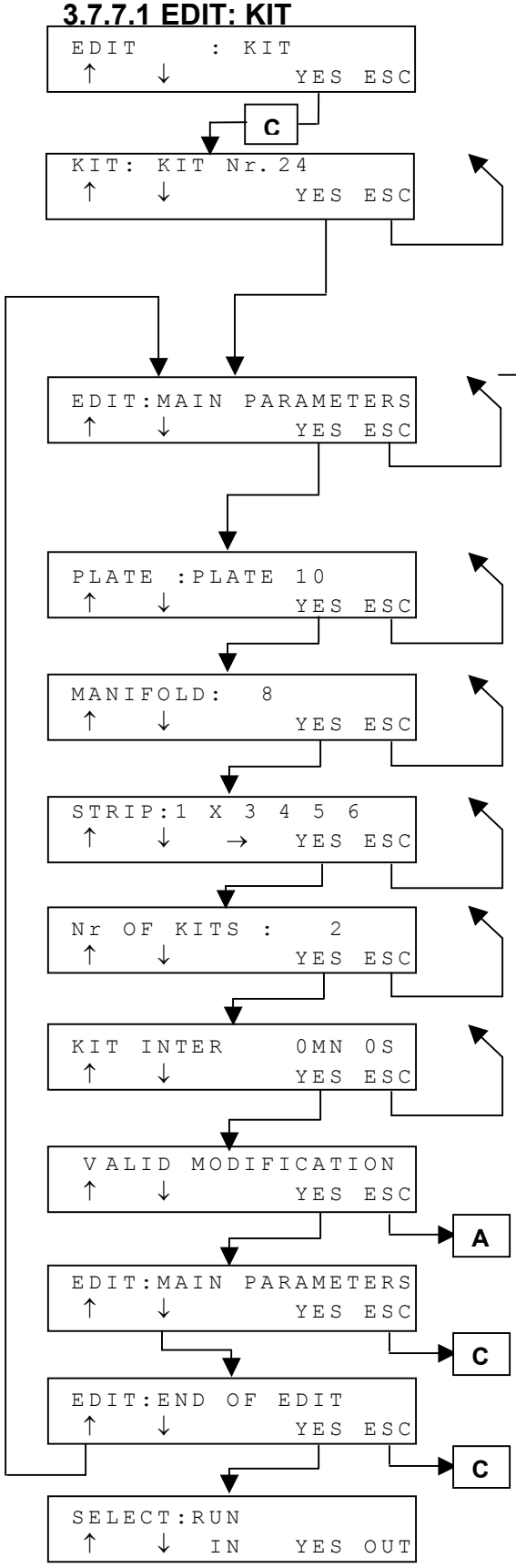


The plate is still associated with one or several kits.
You must first associate an other plate to affected kits or deleted kits prior deleting this plate.

3.7 PROGRAMMING (continued)

3.7.7 EDIT

3.7.7.1 EDIT: KIT



Select kit to be edited.

Select “MAIN PARAMETERS” or “METHOD” with ”↑” and “↓” keys.

Edit main parameters:
Every displayed parameter can be changed by using "↑" or "↓" keys. **Example**: the plate associated to this kit can be changed.

Press “YES” to validate the main parameters modification.

Press “↑” or “↓” keys until “END of EDIT” message.

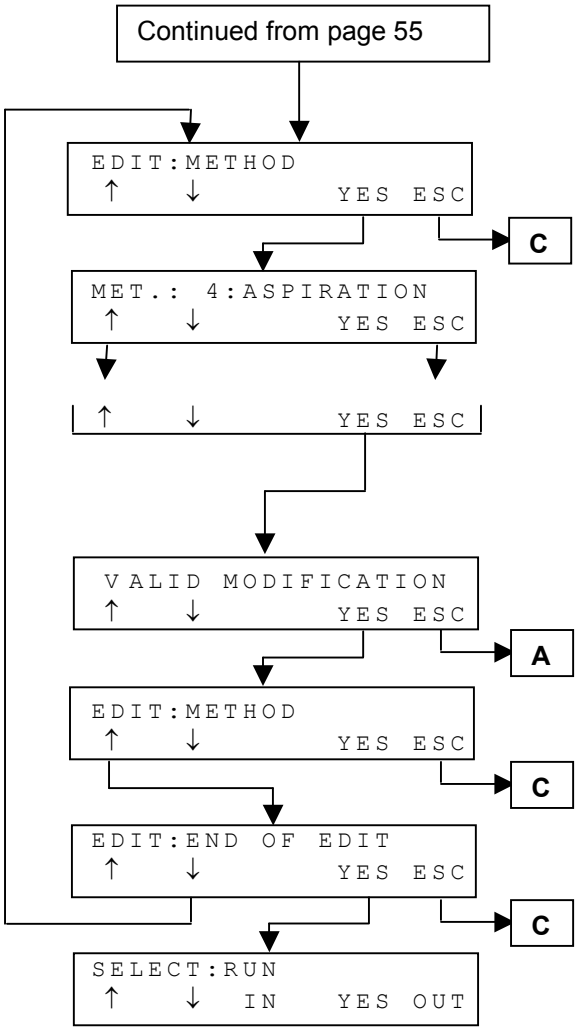
Press “YES” to quit EDIT mode.
Press “↑” or “↓” keys to go back to “Main Parameters” or “Method”.

A : Return to the main menu, see § 3.3.

3.7 PROGRAMMING (continued)

3.7.7 EDIT (continued)

3.7.7.1 EDIT: KIT (continued)



Select method to be edited.
Then, every parameter of the method can be modified by using "↑" or "↓" keys.
Note that the "Liquid: Wash Wx" cannot be modified.

Press "YES" to validate method modification.

Press "↑" or "↓" keys until "END OF EDIT" message.

Press "YES" to quit EDIT mode.
Press "↑" or "↓" keys to go back to "Main Parameters" or "Method".

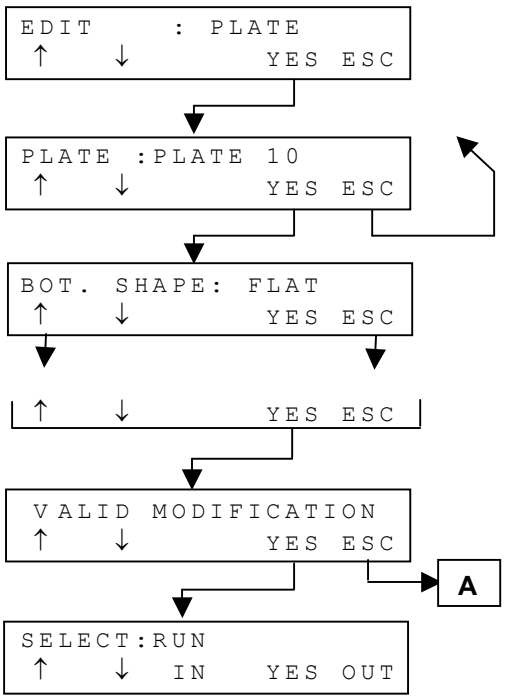
A: Back to main menu
see § 3.3.

C: Back to kit edition
see § 3.7.7.1.

3.7 PROGRAMMING (continued)

3.7.7 EDIT (continued)

3.7.7.2 EDIT: PLATE



Select plate to be edited.

Every parameter of the selected plate can be modified by using "↑" or "↓" keys.

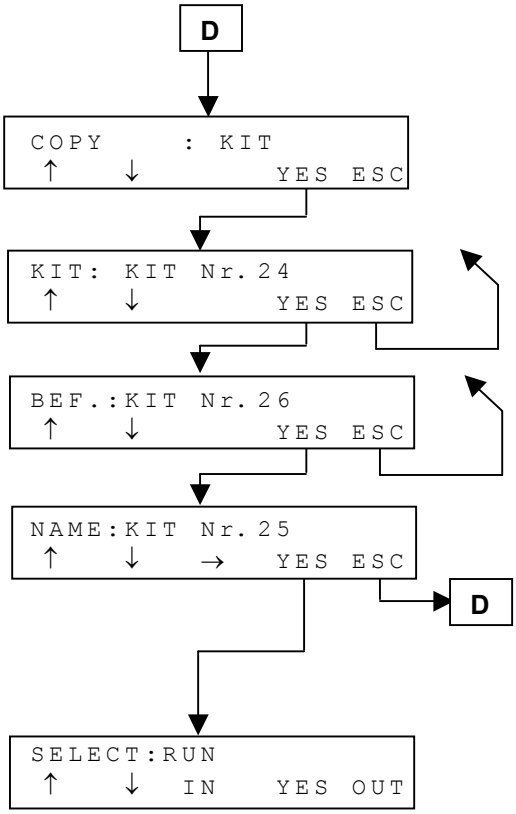
Press "YES" to validate main parameters modification.

A: Back to main menu
see § 3.3.

3.7 PROGRAMMING (continued)

3.7.8 COPY

3.7.8.1 COPY: KIT

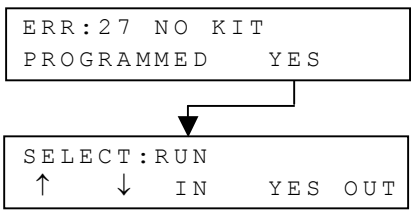


Select kit to be copied.

Select kit **before** which you want to place copy.

Enter copy name: select character with "↑" and "↓" keys. Then press "→" key to move to the next character (up to 15 characters).

3.7.8.2 ERRORS in KIT copy

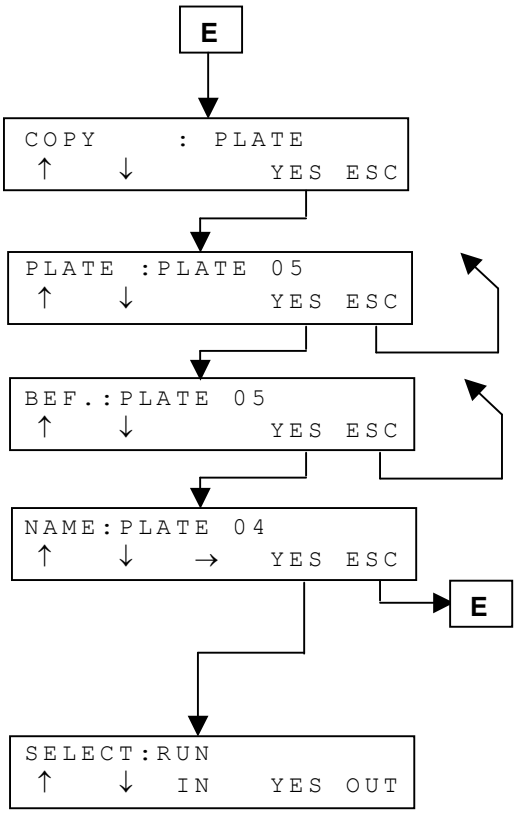


No kit programmed!
You must first "ADD" a kit.
See also ERR: 24
ERR: 25
ERR: 32
On § 3.7.4.2.

3.7 PROGRAMMING (continued)

3.7.8 COPY (continued)

3.7.8.3 COPY : PLATE

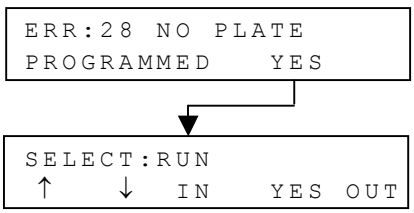


Select the plate to be copied.

Select the plate **before** which want to place copy.

Enter copy name: select character with "↑" and "↓" keys. Then press "→" key to move to next character (up to 8 characters)

3.7.8.4 ERRORS in PLATE copy

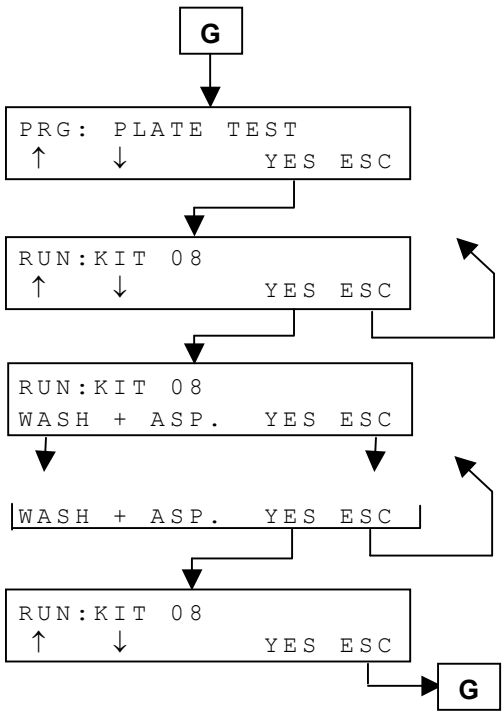


No plate programmed!
You must first "ADD" a plate.
See also ERR : 26
ERR : 33
On § 3.7.4.6.

3.7PROGRAMMING (continued)

3.7.9 Plate Test

Step-by-Step RUN
The programmed kit can be used in a step-by-step mode, i.e. manifold and plate carrier are stopped at each programmed positions (Aspiration Horizontal Position, Aspiration Vertical Position, Overflow Position etc…) in order to check if these positions are correct. If not correct, the user must edit (see § 3.7.7) the tested kit or its assigned plate in order to modify position parameter(s).



Use "↑" or "↓" keys to select kit to be tested.

Press "YES" key to move to next programmed position.
Keep "YES" key pressed for a continuous motion (preferably deactivate the beep).
The kit is processed on the whole plate.

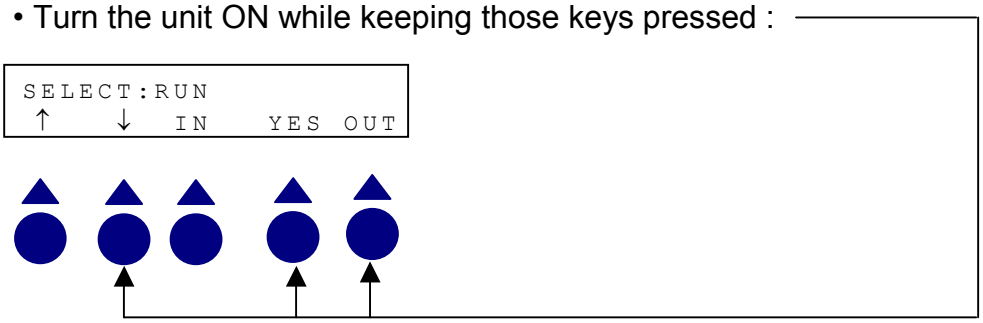
3.7 PROGRAMMING (continued)

3.7.10 RAM initialization

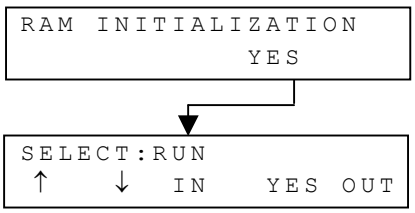
Every programmed kit and programmed plate are saved on a RAM (Random Access Memory).
The contents of this MEMORY can be erased by a “RAM initialization” thus deleting the whole set of kits and plates that have been programmed by the user.
Instrument software and DEMO kits and plates are not deleted as they are saved in an EPROM not affected by RAM initialization.

How to perform the **RAM initialization**?

• Turn the unit ON while keeping those keys pressed :



Following message is displayed:



Press “YES” to have the RAM reset.

4• MAINTENANCE & TROUBLESHOOTING

4.1 Routine maintenance procedures

4.1.1 Daily maintenance

Prior starting to wash:
It is recommended to pour an appropriate disinfection solution into the bottom of the WASTE bottle prior connecting it to the washer. Thus, the infected liquid coming from the washer and going into the WASTE bottle will be deactivated.

IMPORTANT: Avoid bleach
Fill the rinse bottle with deionized water. Connect it to the washer. Launch a Rinsing sequence and check that the pinch valve tube and manifold are not clogged.
Otherwise, change the pinch valve tube and clean manifold (see § 4.2.1 hereafter).

When washing is terminated:
Rinse the washer. Use only deionized water for rinsing. Turn the washer off. Tubes and manifold will be kept wet with water that will prevent them from clogging.
Empty the WASH bottle, rinse it thoroughly with deionized water.

4.1.2 Washer storage conditions

The washer should never be stored with Wash solution inside dispensing tubes and manifold. Otherwise the liquid pump, the pinch valve tube and the manifold might be clamped if completely dry, thus preventing any further dispensing of liquid.
In this case priming must be made with the help of a syringe filled with deionized water connected to the Rinse input of the washer.

4.2 Cleaning and disinfection

4.2.1 Cleaning the manifold

The manifold is infectious.
Disinfect it prior to any further cleaning.
See disinfection procedure on next § 4.2.2.

Aspirate needle and chamber

•Remove the manifold.
•Using a duster or a non scratching utensil, thoroughly clean the outside of the dispense and aspirate needles.
•Remove the silicon top seal of the manifold.
•Using the big pin supplied in the maintenance kit, clean the big aspirating needles.
•Rinse out the aspirate chamber with deionized or distilled water. Thoroughly clean the walls of the aspirating cavity.
•Look through the aspirate needles to ensure that cleaning is adequate.
•Put the silicon top seal back in its place.

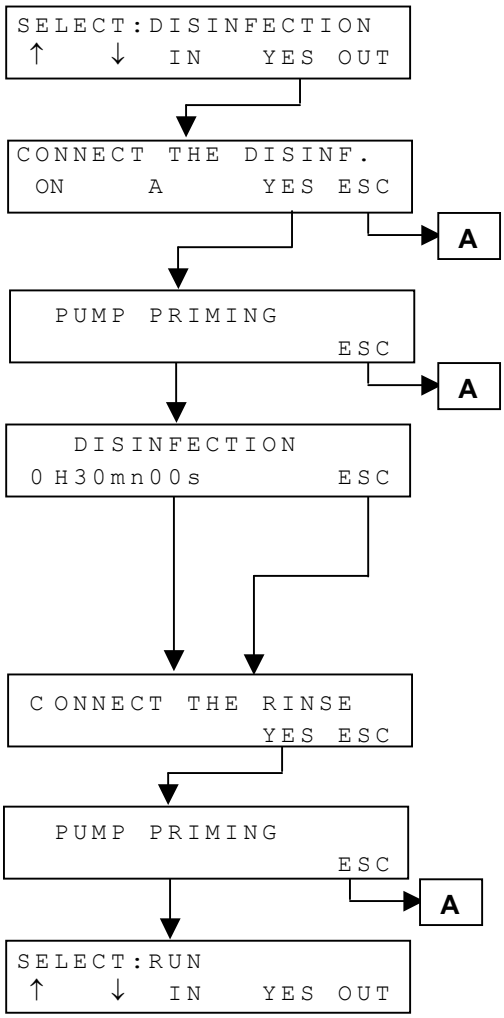
Dispense needle and chamber

•Push the silicon cap from the chamber of the manifold using a stem or a screwdriver entered from the opposite end of the cylindrical chamber.
•Using one of the small pin supplied in maintenance kit, clean the small dispense needle.
•Using the cylindrical brush supplied in maintenance kit, thoroughly clean the small dispense chamber. Thoroughly rinse dispense chamber with deionized water. Ensure that all impurities are removed from the manifold.
•Plug dispense chamber of the manifold with the silicon plug. Place it as close as possible to the first needle however without blocking it. Extra silicon caps are supplied in the maintenance kit.
•Remount the manifold, replace the tubing and reprime.

4.2 Cleaning and disinfection (continued)

4.2.2 Disinfection

The disinfection program applies to internal surfaces of tubing, connectors, manifold and manifold needles.



Use disinfection solution approved by your laboratory. Connect the tube(s) on rinse bottle cap. Fill the RINSE bottle with the disinfection solution.
Ensure the plate carrier is not removed, then press "YES".

Pumps are stopped whereas dispensing circuits are filled with disinfection solution.
A countdown of 30 min. is started after which you are prompted to perform a RINSE operation.

Remove disinfection solution and fill RINSE bottle with deionized water (DiH2O).
Then press "YES".

Then prior launching a Wash protocol, assign the correct Wash solution to the wash input(s) in the CONFIGURATION menu or by priming the circuit with the PRIMING/RINSING menu.

A : Return to the main

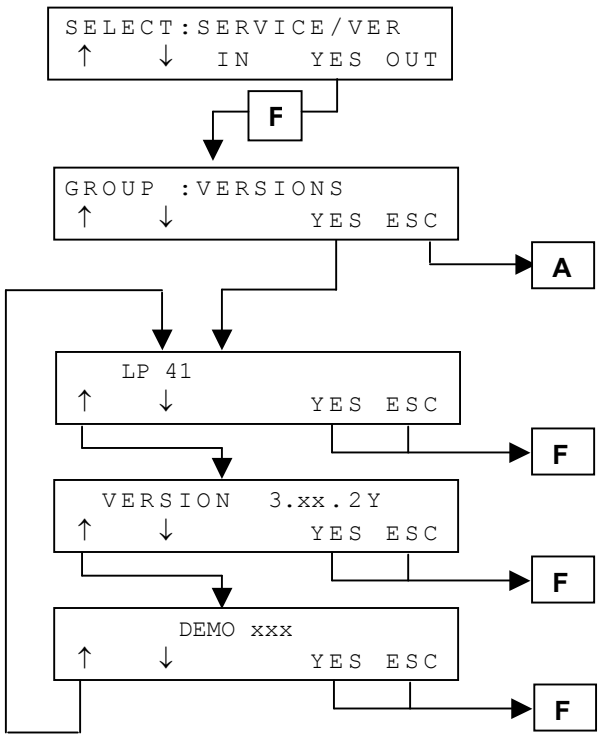
IMPORTANT:

• Avoid bleach in disinfecting the washer as a thorough rinsing of the tubes will not prevent traces of bleach from remain inside the tubing and manifold. This can be enough to corrupt the reagents of next wash.
• Disinfect the washer when it has not been used for more than one day. When used daily, disinfect it at least once a week.
• Disinfect the washer prior to any servicing or handling action, shipment or change of site.

The final RINSING sequence must be performed in all cases after the disinfection procedure has been started (even for demonstration purpose).
The software uses this final rinsing sequence to set the "Rinse" liquid at all 4 inputs.
The automatic rinsing will not be possible (ERR 18) if rinsing is not done after disinfection.

4.3 Troubleshooting

4.3.1 Hardware and software version



"↑" and "↓" keys are deactivated on this prompt.

Hardware version.

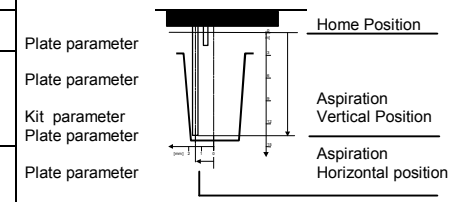
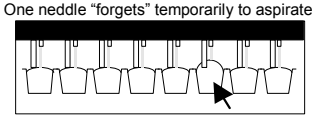
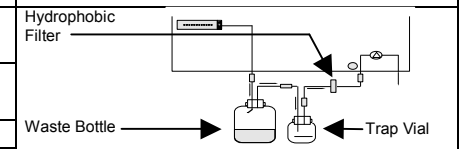
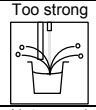
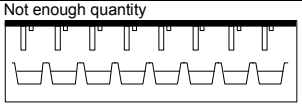
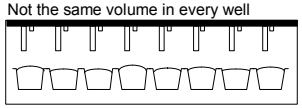
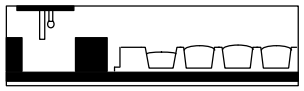
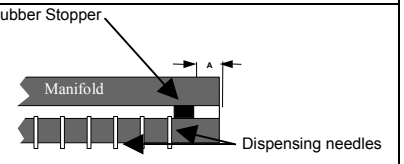
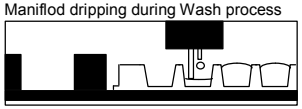
Software version of the washer.

Default User Data version
- Kit list and
- Plate list

programmed in the factory and saved on EPROM.
(Default user data are not deleted by a RAM initialisation).

A: Back to main menu
see § 3.3.

Recommendations for optimized Washing conditions on LP40 / LP41 washers

Bad Washing condition	Factor generating risks	How to restore good washing conditions?	Comments
Inadequate aspiration		Adjust Aspiration Parameters	
Too much residual volume in the wells	**- Aspiration Vertical Position** not set correctly	ASPiration VERTical POSition must be touching bottom of well to avoid aspiring needles blocked by foam (*)	
	- Aspiration Horizontal Position not set correctly	ASPiration HORizontal POSition must be as possible to well's wall. Use CROSswise ASPiration Compensable possible horizontal offset with CENTERING parameter	
	- Aspiration Downward Speed not set correctly	Reduce ASPiration DOWNward SPEED	
One neddle "forgets" temporarily to aspirate 	**- High concentration of wetting agent in wash buffer :** needle might be blocked by foam	Respect dilution factor. Never use higer wetting agent concentration than required.	
	- Waste bottle is full	Check waste bottle, ensure no foam goes on the yellow tube. Empty Waste Bottle prior starting to wash	
	- Hydrophobic Filter is clogged	Change Hydrophobic Filter Possibly install a trap vial	
	Contact your application specialist for advice		
Inadequate dispensing		Adjust Dispensing Parameters	
Too strong  Too weak	**- Flow Rate** is not set correctly	Adjust FLOW rate compensation between –5 (weak) and +5 (strong)	Kit parameter
Not enough quantity 	**- Volume** is not set correctly	Adjust VOLUME between 50 to 3000 µL by step of 50 µL Always dispense slightly more than the awaited volume in the well and aspirate the volume in excess by setting the OVERFLOW position (see below)	Kit parameter
Not the same volume in every well 	**- One or several dispensing needles must be cleaned**	Always ensure dispensing needles are clean Use metallic cleaning pin supplied in maintenance kit	
	- Owerflow position not set correctly	Adjust OVERFLOW position of the apsirating needle in order to aspirate the excess of dispensed VOLUME	Kit parameter
Often less volume in 1st strip than in the nextones. (Manifold dripping in rinsing tank when on standby before wash process) 	**- High concentration of wetting agent in wash buffer**	Respect dilution factor. Never use higher wetting agent concentration than required.	
	- Rubber stopper in manifold dispensing chamber not set correctly This might create an excessive air bibble inside the dispensing chamber of manifold leading to dripping	**"A" dimension for Rubber Stopper [mm]** Shape of rubber stopper: Square / Round Manifold channel 8: 23≤ A ≤24 / 26≤ A ≤27 2*8: 0 / 0 3*8: 0 / 0 12: 5≤ A ≤6 / 8≤ A ≤9 2*12: 0 / 0	
	- Manifold is dirty	Clean manifold, rinse and dry it completely	Cleaning set supplied in Maintenance Kit
		Spray silicone grease onto dispensing needles	-Protect aspirating needles with adhesive tape -Clean inside of dispensing needles with metallic pin supplied in maintenance Kit.
Maniflod dripping during Wash process 	**- If still dripping**	Active **"MiniPrime"** and **"Secured Stop"** to compensate and minimize dripping	In Main menu, select "CONFIGURATION", available in firmware equal or more recent than 1.50.2Y for LP40 And 4.43.2Y for LP41
	- Pinch Valve Tube is leaking	Change pinch Valve tube	Spare supplied in Maintenance Kit
	- Manifold connector with O-rings is leaking	Ensure O-rings are correctly seated in manifold connector if still leaking, change O-rings.	Spare supplied in Maintenance Kit
	Contact your application specialist for advice		

APPENDIX

Revision	Upgrade Description
December 1996	First official release of the user manual compatible for both LP40 and LP41 washers.
April 1997	Implementation of the new motorised multiwasher selector. Modified pages -page 13 § 1.6 LP41 Hydraulic circuit -page 38 § 3.6.2 Washer's configuration Implementation of the selection between the new multiwash selector (MOTOR) and the old one (PINCH valve). Page 39 modified accordingly and page 40 created.
September 1997	Implementation of the new, internal design with integrated blocking device of the manifold. Modified pages -page 28 § 2. installation
January 2000	Added: "Important Notice" § Modified page - 4 New Adil logo, e-mail address ans website Modified Front page
November 2000	ADD "V" function Modified pages 46, 48, 49, 50 Inversion of "Aspiration horizontal position" and "Centering" functions Modified page 48 ADD "reset config." function Modified page 40
March 2003	Manual User converted in Word format
April 2005	Adil instruments logo remplecement by Bio-Rad's one
September 2005	Addition of NOTA on page 3.

INDEX

Symbols

A

Access to PROGRAMMING 41
ADD: KIT 43
ADD: METHOD 45
ADD: PLATE 47
Aerosol Protection Cover 7
AGITATION *16*, 25
Agitation Amplitude *25*
Agitation speed *25*
Agitation Time 25
ASP. DOWNW. SPEED 18
ASP. HOR. POS. 18
ASP. TIME 18
ASP.VERT.POS. 18
ASPIRATION *16*, *18*
Aspiration Downward Speed 18
Aspiration Horizontal Position 18
Aspiration time 18
Aspiration Vertical Position 18
Autoclavage 7

B

B E E P 39
B.W.VERT.POS. 22
B.WASH+B.ASP 16
BOT.ASP. NUMBER 23
BOT.DOWNW. SPEED 22
BOT.SHAPE 47
BOT.UPWARD SPEED 22
BOT.VERT.POS. 24
BOT.WASH NUMBER 22
BOT.WASH+ASP 16
Bottom (Aspiration) Vertical Position 24
BOTTOM ASP. *16*, 23, 24
Bottom Aspiration Number *23*
Bottom Downward Speed 22
BOTTOM TIME 22
Bottom Upward Speed 22
Bottom Wash Number *22*
Bottom Wash Time *22*
Bottom Wash Vertical Position 22
BOTTOM WASH. *16*, *21*

C

C E N T E R I N G 47
Cleaning the manifold 63
Compensation 19
Contents *2*
COPY: KIT 58
Crosswise aspiration 18
CROSW. ASP. 18
cut-off device *5*
CWA 18

D

Daily maintenance 62
DELETE 53
DELETE: METHOD 53
DELETE: PLATE 54
DELETE:KIT 53
Disinfection 64
DISP. UPW. SPEED 19
DISPENSING *16*, *19*
Dispensing Upward Speed 19

E

E D I T : M E T H O D 56
E N D O F E D I T 55
EDIT: KIT 55
Electric Shock hazard 5
Electrical Data 13
ERR:21 *32*
ERR:24 44
ERR:25 44, 46
ERR:26 50
ERR:27 58
ERR:28 59
ERR:29 54
ERR:32 *44*
ERR:33 50
ERROR on PLATE deletion 54
ERRORS in KIT programming 44
ERRORS in METHOD programming 46
ERRORS on PLATE programming 50

F

FLOW 19
Flow rate compensation 19

H

Hardware specifications 13
Hardware version 65
HORIZONTAL SPEED 48

I

IN 29
INSERT 51
INSERT : METHOD 51
INSERT: PLATE 52
INSERT:KIT 51

K

Keyboard 29
KIT *15*
KIT Parameter 18
Kit parameters 18
Kit Structure 40

L

LIQUID 19
LP40 Basic features 7
LP40 Outside dimensions 8
LP41 Basic features 10
LP41 Outside dimensions 11

M

Main Parameters 55
maintenance 62
Manifold 7
MEMORY *61*
MET. INTER 17
method *16*
Method Interval 17
Methods *15*, 16
Microplate loading 30
Mini Priming 39

O

Omit Strip 43
Out 29
OVERFLOW 19
Overflow Position 26

P

Physical data 13
Plate Agitation 25
Plate Carrier 10
Plate Mode 16
PLATE parameter 18
Please RINSE 34
Prime 31
PROGRAMMING in Advanced Mode *41*
Programming Synopsis 42
Pump Priming 31

R

Routine maintenance 62
RS232 serial port for connection to PC 10

S

Secured Stop 39
safety information *5*
SHAKE TIME 25
SHAKING AMPLITUDE 25
SHAKING SPEED 25
Soak time 17
SOAKING 17
Software parameters for Wash protocols 15
Software specifications 14
Software version 65
Strip Mode 16

T

Technical features 13
TEMPORARY KIT 51
Troubleshooting 65

U

Unpacking 27

V

Vertical Speed 48
VOLUME 19

W

WASH *16*, *20*
WASH + ASP 16
Wash + Aspiration 16
Wash + Bottom Aspiration 16
WASH+BOT.ASP 16

2*8- CHANNEL 10
3 LIQUID INPUTS 10
8- CHANNEL 7

Fisher Scientific
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Belgique / België	tél 056 260 260	fax 056 260 270	be.fisher@thermofisher.com	www.be.fishersci.com
España	tfno 91 515 92 34	fax 91 515 92 35	es.fisher@thermofisher.com	www.es.fishersci.com
France	tél 03 88 67 53 20	fax 03 88 67 11 68	fr.commande@thermofisher.com	www.fr.fishersci.com
Italia	tel 02 953 28 258	fax 02 953 27 374	it.fisher@thermofisher.com	www.it.fishersci.com
Netherlands	tel 020 487 70 00	fax 020 487 70 70	nl.info@thermofisher.com	www.fishersci.nl
Portugal	tel 21 425 33 50	fax 21 425 33 51	pt.fisher@thermofisher.com	www.pt.fishersci.com
Suisse / Switzerland	tél 056 618 41 11	fax 056 618 41 41	info.ch@thermofisher.com	www.ch.fishersci.com